

The Iron Age

A Review of the Hardware, Iron and Metal Trades.

INDEX TO
READING MATTER,
PAGE 26.

INDEX TO
ADVERTISEMENTS,
PAGE 29.

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An Improved Band-Saw.

The accompanying illustration represents an improved form of band-saw made by Goodell & Waters, of Philadelphia, which is especially adapted for pattern-making and cabinet work. It dispenses with the ordinary heavy iron base, and consequently with a large proportion of the weight and room occupied, and can also be made on this account much cheaper than the ordinary form without its efficiency being in any way impaired. Besides this reduction in the cost of the machine, the decreased weight also insures a greater economy in transportation and in setting up, the total weight of the machine complete being about 650 pounds. This saw can be attached to any size or shape of column, and will run with all the steadiness and accuracy of a heavier machine. It is often desirable to have a band-saw in a small room on an upper floor where it would be difficult, if not impracticable, to put a saw with a heavy frame. It is for such places that this machine is peculiarly adapted on account of its lightness and compact form, as it can be carried up an ordinary stairway by two men. The wheels, which embody quite a number of improvements, have hubs some 3 inches in length, with annular projections extending parallel to the axis on the periphery of the hub, through which a number of holes are drilled. The spokes, which are of $\frac{1}{8}$ -inch round iron, and threaded on each end, are screwed in these holes, as may be seen by reference to the cut. The spokes are held by nuts on each side of the annular projection, which arrangement enables the operator to true up the wheels if from any cause they get sprung. The wheel rims are made of six thin strips of wood glued together and covered with an endless rubber band in the ordinary manner, and are true'd up on the inside before the spider—i. e., hub and spokes—is put in. The uniform strain, expansion, contraction and sudden stress caused by chips getting between the saw blade and wheels is allowed for by a combination of weight and spring, which tends to elevate the hub of the upper wheel. The weight maintains a uniform tension, compensating for variations in length arising from temperature, while the spring, which is merely a heavy rubber washer about $\frac{1}{4}$ inch in thickness, regulates the tension of the saw in case of any sudden friction or strain. This combination is designed to save the machine from all sudden jars and the consequent breakage of the saw. The table is so arranged that it can be tilted to any desired angle within 45°. The makers claim that, notwithstanding its lightness of construction, it is fully as efficient as the larger and heavier band-saws.

The Generation of Steam.

At a meeting of the British Institution of Civil Engineers, on December 6, the second of six lectures on "Heat in its Mechanical Applications" was delivered by Mr. William Anderson, the subject being "The Generation of Steam and the Thermo-Dynamic Problems Involved." Mr. Anderson remarked that the source of our fuel supply was derived from the rays of the sun acting upon the earth ages ago. He pointed out that those rays were of complex structure, intimately bound together and yet capable of being separated and analyzed, and that it required over 1000 horse-power to separate 1 ton of carbon from the atmosphere in 12 hours; but that, in consequence of the enormous area of leaf-surface in which the decomposition took place, the action was silent and imperceptible. As soon as a law of definite chemical combination had been established, chemists began to suspect that the changes of temperature observed in chemical reactions were also of a definite kind, and that they were as much the property of matter as chemical atomic weights. In the last century Lavoisier and Laplace, and after them, down to the present time, Dulong, Despretz, Favre and Silbermann, Andrews, Berthelot, Thomson and others had devoted much time and labor to the experimental determination of the heat of combustion and the laws which governed its development. Messrs. Favre and Silbermann, in particular, between the years 1845 and 1852, had carried out a splendid series of experiments, by means of a calorimeter, which was illustrated by a diagram. The apparatus consisted of a gilt copper receiver, in which the substances tested were burnt by a jet of gas. This receiver was immersed in another vessel containing water, which again was protected by another vessel lined with swansdown. Thermometers of great delicacy were employed to determine the temperatures, and the whole of the apparatus used for generating the gases and for collecting the products of combustion was constructed with the utmost ingenuity and skill. Messrs. Favre and Silbermann adopted the plan of ascertaining the weight of the substances consumed, by calculations from the weight of the products of combustion. By this means they were enabled to deal with larger quantities, and several errors incidental to the opposite process were eliminated. A table was given showing the calorific value and the chemical composition of such substances as commonly formed the constituents of fuel.

The thermo-chemical laws relating to combustion and decomposition were then stated, and the general formula for calculating the thermic value of any kind of fuel whose analysis was known was explained. It was

pointed out that energy existed on the earth in a form which was often unsuitable for the wants of man. For example, the water flowing down the Alps was competent to furnish the power necessary for boring through those mountains, but it was not in a form which could be used directly. The kinetic energy of the water had first to be transformed into the potential energy of compressed air, and in that form it became available for the miners. In the same way the energy of combustion could not be applied directly to the wants of man. It had first to be converted into the form of steam or air at high pressure and temperature, and then, by means of suitable heat engines, it could be used in the manner with which all were familiar. It was probably to this circumstance that the tardy development of the steam engine was due, for its history dated back only some 200 years—a very small proportion of the time during which the human race had existed. A steam boiler was in reality a species of heat engine, and its action should be investigated upon the same principles, and consequently the doctrines of Carnot were applied. According to these, the efficiency of a boiler depended entirely upon the range of temperature through which the heated gases acted, and, by means of an illustration derived from an application of water-power, it was demonstrated that the proper way to increase the efficiency of a boiler was to raise the temperature of the furnace to the utmost degree possible, and to lower the temperature of the smoke to the lowest point practicable. Particular instances were then taken in which it was shown that 1 pound of carbon would be capable of evaporating 14.87 pounds of water from and at 212° F.

The case of the prize engine at the Cardiff show of the Royal Agricultural Society in 1872 was described in detail, and it was

much greater when there was a joint between dissimilar materials, such as between the gases of the furnace and the boiler plate, and between the boiler plate and the water. At first sight it would appear a matter of common sense that a boiler which contained its own furnace must be a better generator than one with an external furnace formed of brickwork, but brickwork was an extremely bad conductor of heat, while it was a very good radiator, absorbing heat from the gases and returning them by radiation to the boiler surfaces. This action was strongly pronounced in the case of the reverberatory furnace and in the brick arches now commonly introduced into the fire-boxes of locomotives. The gases forming the products of combustion were very bad absorbers and very bad radiators of heat. Pure dry air and nitrogen were absolutely incapable of absorbing or radiating heat. They were not in the least affected by the passage through them of the most intense heat rays. Carbonic acid was a somewhat better radiator, while the vapor of water

with such fuel as anthracite and coke, burning with very little flame. In the latter case tubular boilers were preferable, but, unless the combustion was perfect before the gases reached the small tubes, the gases cooled down so considerably that the flame was frequently extinguished. This fact was illustrated by an experiment which showed that when pieces of $\frac{1}{4}$ -inch gas-pipe of various lengths were placed over an ordinary gas flame, the shorter tubes allowed the flame to pass through, while the longer ones extinguished it, and the gas could be relighted at their upper ends. Water, being completely adiathermic, and a very bad conductor, could not be heated by direct radiation or conduction. The process of heating by convection was explained in detail, and a comparison was instituted between the heat transmitted from the hot gases in the furnace of a boiler to the water, with the reverse effect of warming by the transfer of heat from hot-water pipes to the air of a room. The two, being reverse operations, agreed very closely together in accordance with the theory of exchanges. The proper heating surface to be allowed in a boiler to effect a given amount of evaporation was then dwelt upon. The mode of calculating the sectional area of tubes and flues was given, the heat of the chimneys and their area was considered, and, finally, the thermodynamic theories relating to the formation of steam were investigated. It was stated that, of necessity, the molecules of steam which became emancipated from the water through the energy of heat carried with them particles of water, and that these particles constituted priming, the amount of which depended upon the velocity with which the steam escaped from the water. A table was exhibited of a large variety of boilers ranged in order of the velocity and disengagement of steam from the water surface, and from this it appeared that those in which the velocity was highest were also those most subject to priming. The doctrine of the viscosity of liquids and gases was next dealt with and applied to account for the manner in which particles of water and of very minute solid impurities were carried over from the water of the boiler into the steam. The same theory was adduced to show that, from the slowness with which smoke fell in the atmosphere, it must be composed of exceedingly small particles, and that they were not very numerous compared with the volume of the gases with which they were associated. It further went to show how it was that complete combustion did not produce any marked economy, because the absence of the white-hot particles of carbon from the gases caused a loss of radiating power. It was thought that no great improvement was to be expected in the economy of boilers, for the limit had been already almost reached. The honor of having first pointed out

the true principles on which the duty of boilers should be estimated—namely, by comparing the work actually done with the potential energy of the fuel used—was due to the late Professor Rankine.

SCIENTIFIC AND TECHNICAL.

A New Compass.

Among a number of improved forms of compasses which have of late been brought before the public is one invented by M. Mascart, the well-known electrician, who has devised a new compass which finds the magnetic meridian by the well-known experiment of moving a coil of wire across the lines of magnetic force of the earth and inducing a current in them. M. Mascart in the construction of this instrument employs an azimuth circle, on which is mounted a ring movable round a horizontal axis. The angle made by the ring with the horizon is measured off by a vertical circle, which is divided off by degree marks in the ordinary manner. A coil of .12 m. (4 $\frac{1}{2}$ inches) in diameter is carried by the ring, and can turn round an axis perpendicular to that of the ring. The size of the apparatus is not greater than an inclination compass. It acts on the principle that when the axis of rotation of the coil is in the magnetic meridian the induced currents in the ring, when rotated, will be nothing. A sensitive galvanometer is employed to show the induction currents. In using the apparatus, a series of trials show that the axis of the ring is perpendicular to the magnetic meridian. A second series place the axis of rotation of the coil in the line of the inclination needle. The observation, with checks, occupies half an hour, which is less time than is necessary to find the inclination by a magnetic needle. From observations made at the Observatory of the Parc Saint Maur, by M. Moureaux, the new compass seems to be as correct as the inclination compass.

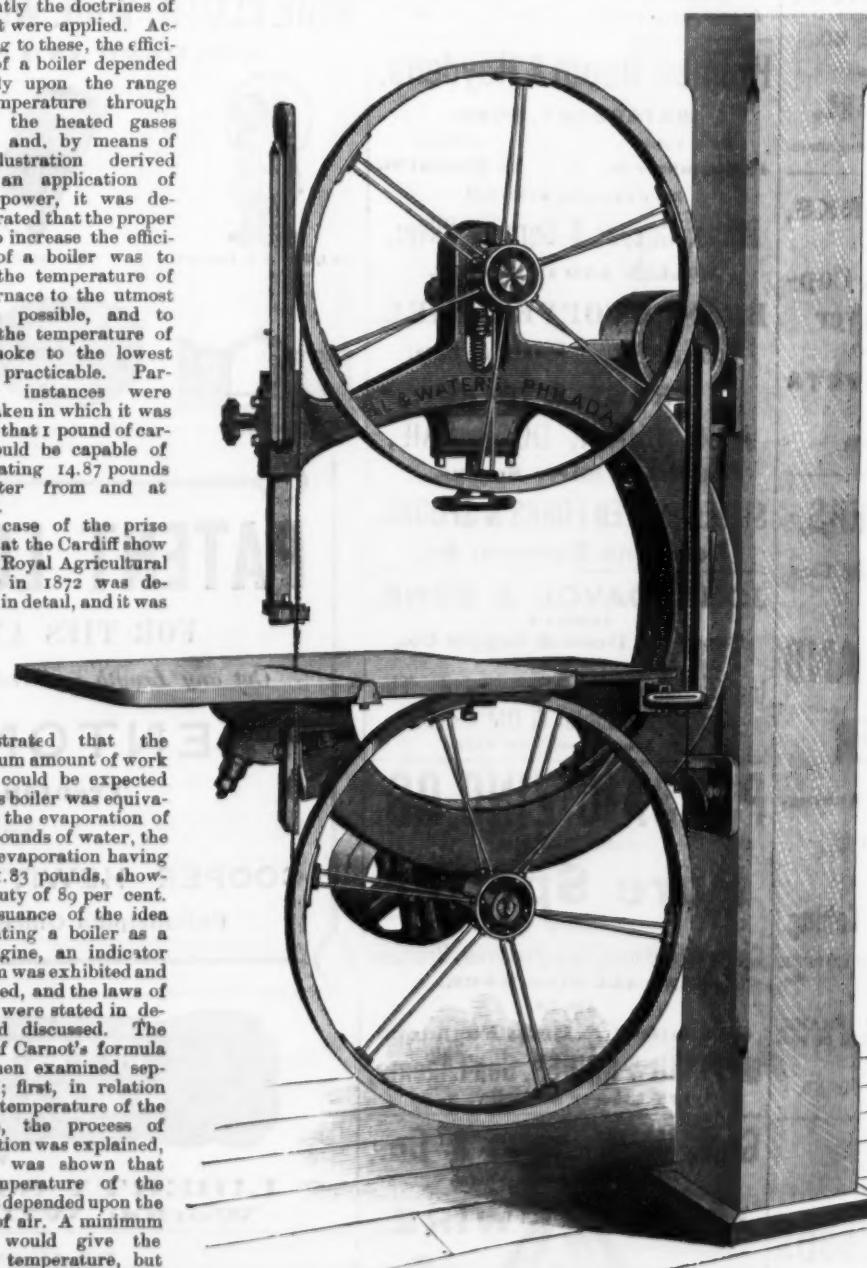
Elevated Electrical Railroads.

Judging from report, definite steps are now being taken to secure the introduction of electricity as a motive power on elevated as well as surface railroads. At the meeting of the Rapid Transit Commissioners recently held in New York, William F. Sherman, of Chicago, secretary and superintendent of the Chicago Elevated Passenger and Automatic Mining Railway Company, called attention to the fact that in Chicago there was in operation a sectional elevated railroad that had carried 50,000 people by electric motor. It had been running in the Exhibition Building for six weeks without accident; it had also been run by cable, and was so constructed that any motor could be applied to it. He asserted that the cost of construction was less than that of any other elevated road. A striking peculiarity of this method is that the car trucks are placed near the top of the car, on the sides, the body of the car hanging below, bringing the center of gravity below the center of support. The car wheels are double-flanged and have oscillating axles, which prevents friction when turning curves. The conducting wires and transmitters are entirely out of the way. If a wheel breaks there is no liability to accident, as the trucks are so constructed that a duplicate wheel takes the load without any depression of the car. On account of the manner in which the cars run—below rather than over the track—it is evident that there is no possibility of the car being derailed or coming in contact with any obstruction on the track. The cars can be run by electricity as fast as 100 miles an hour, or as slow as may be desired, and they can be stopped suddenly without jarring. Mr. Sherman exhibited maps and plans showing the construction of his elevated road and the application of the motive power to the cars, and he invited the commissioners to see the system in operation in Chicago at the Exhibition Building. The cars are practically noiseless, he said, the tracks being sunk in a wooden cushion, and the trestle possessing other peculiarities of construction tending to deaden sound. The cost of the elevated structure, double track, ready for the rails and cushions, would be \$74,000 per mile. He exhibited the prospectus of a proposed rapid-transit electric road in accordance with his system from Boston to San Francisco "in 36 hours." He stated that an act was to be introduced in the Massachusetts Legislature authorizing the construction of an elevated railroad on this system in Boston.

Women as Inventors.

Among recent inventions of importance by women, says a writer in the *North American Review*, are a spinning machine capable of running from 12 to 40 threads; a rotary loom doing three times the work of an ordinary loom; a chain elevator; screw crank for steamships; a fire-escape; a wool feeder and weigher, one of the most delicate machines ever invented, and of incalculable benefit to every wool manufacturer; a portable reservoir for use in case of fire; a process for burning petroleum in place of wood and coal for steam-generating purposes; an improvement in spark arresters, to be applied to locomotives; a danger signal for street crossings on railways; a plan for heating cars without fire; a lubricating felt for subduing friction (the last five all bearing upon railroad travel); a liable type, with adjustable cases and apparatus; machine for trimming pamphlets; writing machine; signal rocket, used in the navy; deep-sea telescope; method of deadening sound

(Continued on Page 5.)



AN IMPROVED FORM OF BAND-SAW.

(Goodell & Waters, Philadelphia.)

was a good absorber, and, therefore, a good radiator. It was then demonstrated that the products of combustion consisted mainly of air and nitrogen, and consequently, taken as a whole, the products of combustion were bad radiators. Little or no economical advantage was derived from making the combustion in a boiler perfect, because the colder luminous flame was a good radiator, on account of the white-hot particles of carbon it contained, while the hotter and non-luminous flame was a bad radiator and carried a great deal of the heat into the chimney. This circumstance was illustrated by an experiment, by which it was proved that an intensely hot non-luminous Bunsen flame had very little more effect upon an air thermometer than a smoky luminous flame burning the same quantity of gas, but that the moment a spiral wire was hung in the Bunsen flame it commenced to glow, and the radiation from the wire immediately had a powerful effect upon the thermometer. It was probably owing to this circumstance that the backwardness of the owners of steam boilers to prevent smoke was to be attributed. Had considerable advantage been obtained by the suppression of smoke, acts of Parliament would not have been necessary for the purpose.

A different class of boiler was required for consuming flaming fuel, as contrasted

with the true principles on which the duty of boilers should be estimated—namely, by comparing the work actually done with the potential energy of the fuel used—was due to the late Professor Rankine. Mr. H. Arnold, of Wilhelmshaven, Germany, has for some time past been conducting an interesting set of experiments as to the influence of sand on the strength of cement mortar. Six different kinds of sand were subjected to test, and the results showed that the strength of mortars similarly made with the same cement depends on the coarseness and size of the grains of sand, and that in sands of equal size of grain that is the best whose grain is the coarsest. In order to determine the influence of the size of the grain, comparisons were made with several specimens of sand of various sized grains, and also with granite chips, the result always being in favor of the latter. It was further found that coarseness of grain is a more important factor in the quality of a sand than the size of grain, and that sand containing uniform sized grains is not always the best. On the whole, however, Mr. Arnold concludes that, although different kinds of sand yield different results with similarly prepared mixtures of mortar, it will not be justifiable in ordinary masonry to alter the

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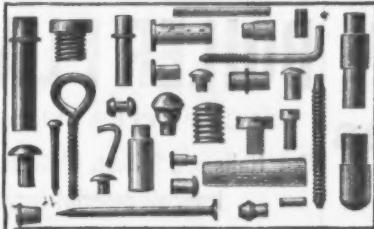
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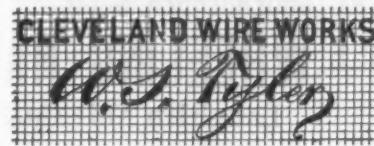
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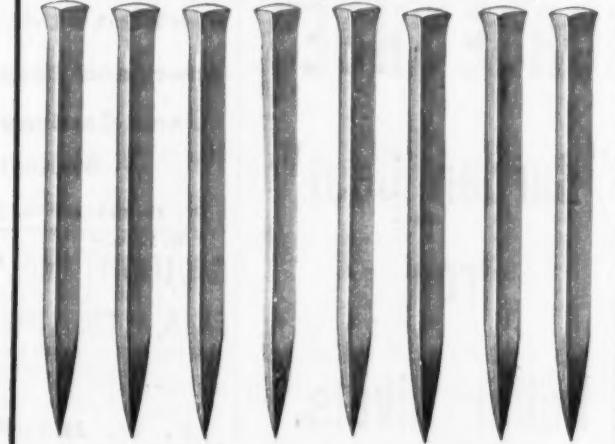
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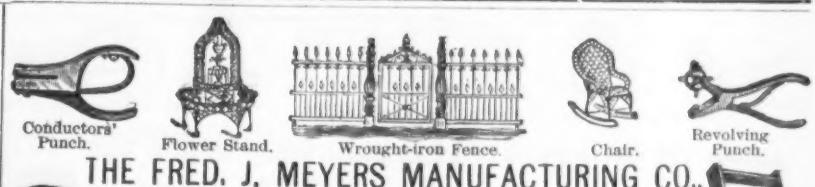
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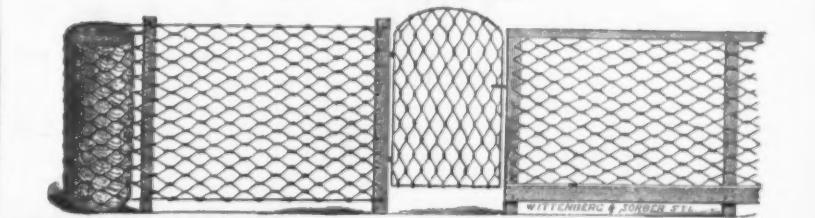
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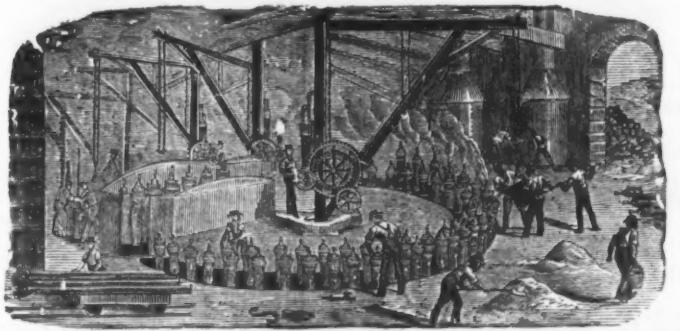
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FIG. 120.

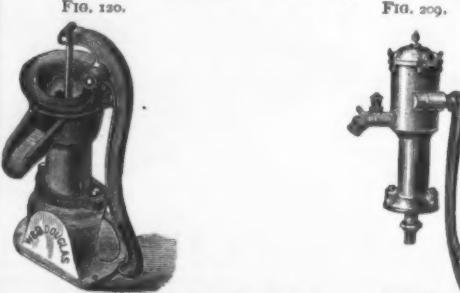


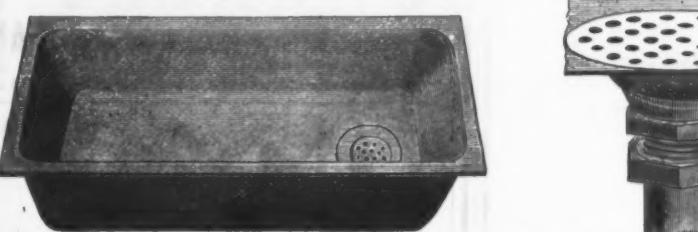
FIG. 209.



FIG. 70.



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One of the strong points of these sinks is the new coupling with which they are now supplied and which is pronounced by all plumbers the best on the market. It is used with both lead and wrought-iron pipe; is a neat, reliable coupling, and is easily detached for the purpose of pumping out the pipe. The strainer and all parts of the coupling are tinned, and are furnished with all sinks without extra charge.

The fact of the great strength and durability of this sink, as it is practically free from danger of breakage in transportation, handling or use, is a strong point in its favor, and that its merits are recognized by most competent judges is evident from the fact that leading houses which have been interested in the common article have taken up the Wrought Steel Sink. Twenty-five per cent. is saved in freight by purchasing Steel Sinks. Orders come from all parts of the United States, Canada, Europe and Australia.

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are kept in position and locked in the V-groove by the weight of the carriage, which, with its load, is suspended under the center of gravity during the passage. The four upper wheels have a crank-handle affixed, by means of which the passengers, seated back to back, can propel the carriage up the short incline at the termination of each journey. For 460 feet or thereabout the trip is accomplished by gravitation. The third rope introduced is placed at a lower level, under the center of gravity. It passes under a single pulley inside the carriage, close to its floor. This under-wire is strained up to sustain one-half of the prescribed load, and is equal in strength to both the upper ropes, the combined breaking strain of the whole being equal to 32 tons, according to the Admiralty test. Immediately on the third rope being strained up to its proper level, and the new carriage being put in its position, Mr. Harper, of Seafield, who has been intrusted by the Great North of Scotland Railway with the design and execution of the scheme, started for the opposite shore, which he reached in the short space of 40 seconds, returning with a passenger, against a strong pressure of wind, in rather less than a minute, without having to use any exertion, except in ascending the few feet of incline as he approached his destination. The ropes are suspended from Scotch fir posts, the tops of which are 15 feet above the level of the river.

Iron Baths for Molten Metals.

With a view to effect saving in the wear of the baths for melting and containing the molten metal employed in the processes of galvanizing, tinning, lead coating and other analogous metallurgical operations, Mr. W. H. Luther, of Glasgow, has suggested some improvements, which, however, have not been patented. Hitherto, such baths have been constructed of the best malleable-iron plate or of steel; and in order to render the baths capable of retaining their shape and durability when containing many tons of molten metal, it has been necessary to employ iron or steel plates of considerable thickness, varying from 1 inch upward. With such thick iron or steel plates as hitherto used, further difficulties are involved in their construction, owing to the necessity of having special punching and bending machinery for the construction of the baths. Owing also to the action of molten metals on the iron or steel used, inferior classes of iron cannot be advantageously employed, for they are not durable, it frequently happening that a hole or rent is formed through the iron shortly after the bath has been in operation, giving rise to a considerable loss of metal. According to the present invention the baths are constructed of a double casing, the space between which may be filled with fire-clay or some such material, or the lining may be dispensed with, in which case the inner casing fits closely into the outer one. The inner casing is made of the best iron or steel plate, and of comparative thinness and preferably welded in place of riveted, while the outer casing may be made of the cheaper qualities of malleable iron, or of cast iron, which may be in one piece or riveted together. According to Mr. Luther's invention, when the baths of the ordinary kind are rendered unfit for further use from the causes mentioned they may, in place of being dealt with as old or scrap iron, be utilized as an outer casing to carry one of his improved inner casings. Another part of the invention consists in the employment of corrugated iron in the construction of the outer shell of the baths, by which great stiffness is obtained and thinner metal may be employed; the increased stiffness of the metal due to the corrugations will also allow of much larger baths being used than the ones employed in ordinary practice.

Failures in England in 1883.

Statistics showing the failures in England last year have been compiled by Mr. Richard Seyd, F. R. S. From these it would appear that there is a steady decline in the number as compared with previous years. We give below the totals for last year:

Years.	Failures.	Wholesale.	Retail.
1877.	11,022	2,172	8,850
1878.	15,059	2,648	12,416
1879.	16,637	2,546	14,091
1880.	13,147	1,478	11,669
1881.	12,006	1,325	10,680
1882.	11,019	1,314	9,705
1883.	10,599	1,361	9,238

In the wholesale and manufacturing trades the failures were as under:

For the years—	1881.	1882.	1883.
In London.	319	309	377
" " "	47	48	49
Manchester.	64	52	58
Lancashire.	58	66	88
Yorkshire (not including Middlesbrough and Hull).	197	211	215
Birmingham and Midland Iron District.	145	94	100
Newcastle, Middlesbrough, Hull and district.	54	42	47
Bristol, Cardiff, Newport and Swansea.	41	30	37
Provinces.	259	250	293
Scotland.	97	78	83
London.	30	15	16
Total.	1,325	1,314	1,361

These figures, on the whole, are considered favorable, though in some lines of business and in certain districts they show anything but a healthy state of affairs.

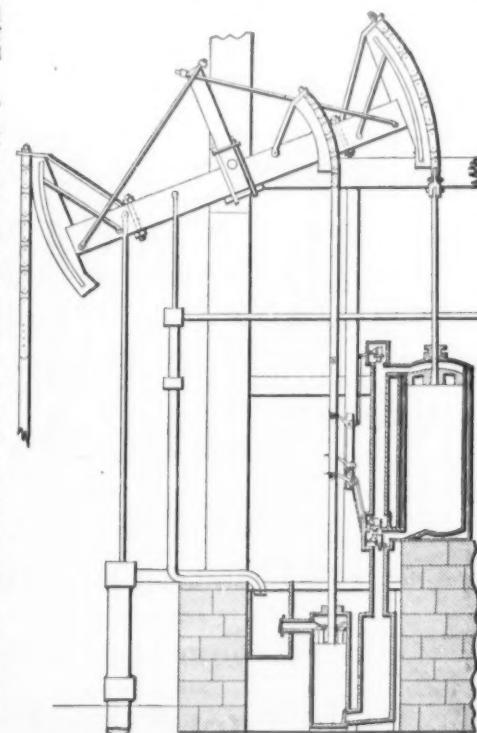
The patent right in a machine for separating straight from crooked wires has been assigned to the Morse Twist Drill and Machine Company, of New Bedford, Mass. It is designed more particularly to the sorting of such wires used as blanks in the manufacture of cutting and boring tools. The blanks are passed, while in rotation, between two parallel plates, the distance between which is equal to the diameter of the wire. When the wire is caused to rotate it will, if it is straight, show it by rotating uninterruptedly. If it is bent, it will be caught at some point of its rotation.

The Inventions of Watt.

BY EDWARD A. COWPER.*

It is generally known that James Watt left a number of models of various kinds, some at his house, Heathfield Hall, Handsworth, near Birmingham, and some at his works, Soho, near Birmingham, but no general description has appeared of them, and as no explanation or description is appended to them, it is necessary to "read" their meaning after careful examination and comparison. This has been attempted by the author, who also suggested that, as many of the Watt models at South Kensington had got the dry-rot and were very badly worm-eaten, drawings and photographs should be taken of them by the Institution, so that a perfect record of them might be obtained before they were entirely destroyed.

The Department of Science and Art at South Kensington very kindly entertained the idea of photographing such models as it was useful to photograph, and have very liberally presented copies to our Institution. Col. Stuart Wortley (the curator of the Patent Office Museum) also kindly allowed particulars to be taken of the parts of Watt's engine and other machines which are in that



Watt's Inventions.—Fig. 1.—Model of Early Pumping Engine, 1769.

museum. Mr. George Tangye, one of our members, has very kindly responded to the author's request to have photographs of the two important machines in the "Watt Room," in Heathfield Hall (now inhabited by Mr. Tangye), and he has had photographs taken of a number of other interesting articles and tools, including Mr. Watt's own lathe,

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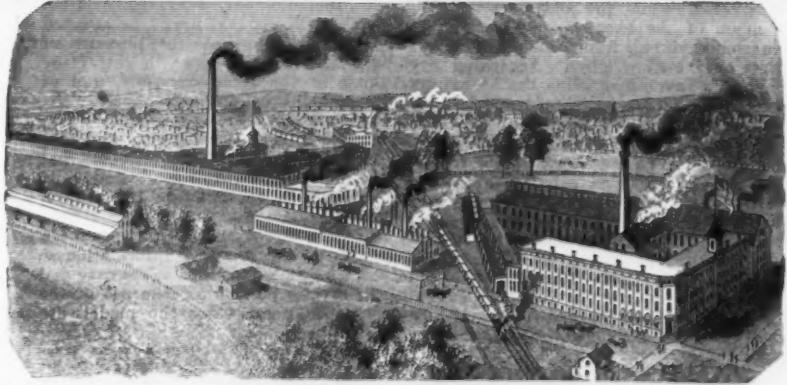
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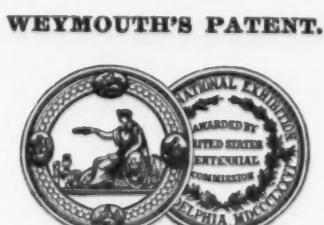
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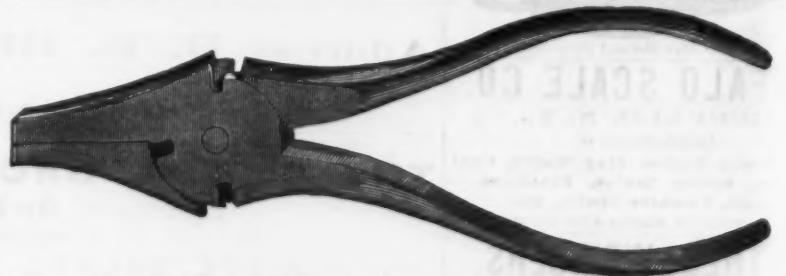
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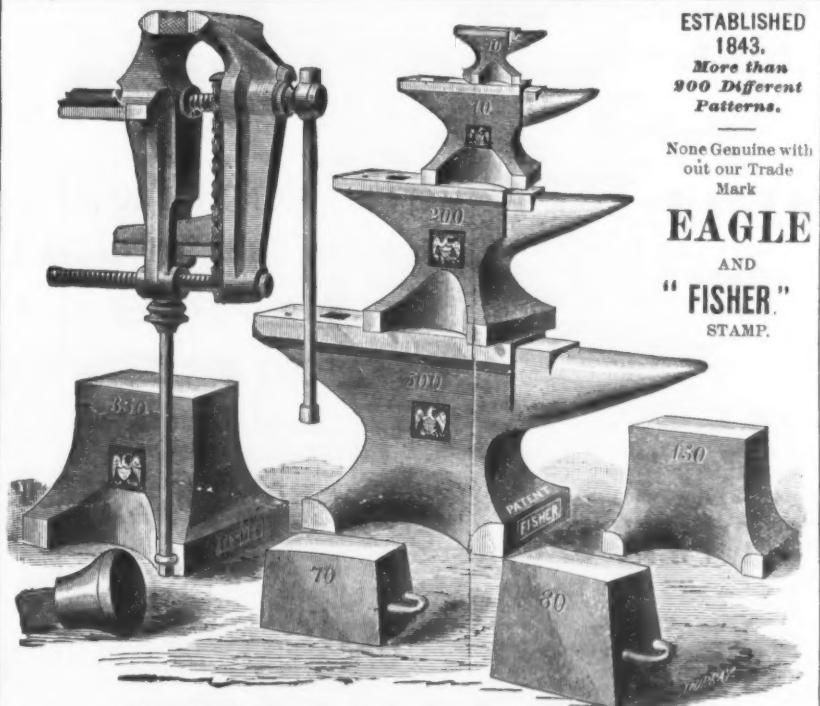
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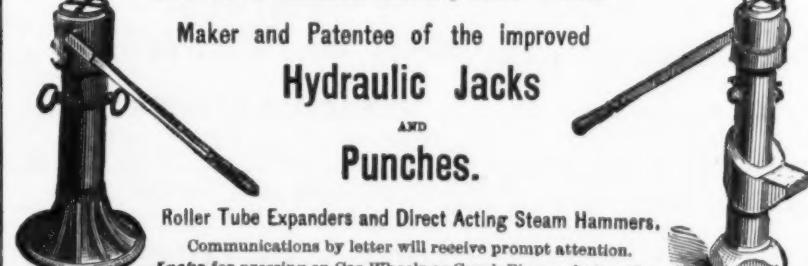
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23. Hammer.
24. Unfinished model of cylinder.
25. Counter, intermittent (no diagram).
26. Counter, geared, 1817.
27. Grinding machine.
28. Pulverizer.
29. Copying press, with rollers, 1750.
30. Copying press, with screw, 1780.
31. Wedges.
32. Copying machine for sculpture.
33. Trussed frame for copying machine (no diagram).
34. Reducing machine for sculpture.

At the risk of commencing a description of the inventions of James Watt with a three-told tale, the author feels bound to take into account, to some extent at all events, the sequence of the inventions of the great man whose works we are endeavoring to decipher. It is sometimes a matter of intense interest to any one who has attempted to improve a machine, to realize the process of thought through which a successful man of

was admitted to the bottom of the cylinder to let the piston go up again. Such engines could, of course, only work very slowly, as the cylinder had to be heated up a good deal before the steam would fill it.

The author is sorry to say that the old pumping engine first made by James Watt and used at Soho for pumping water up into Soho Pool, to be used on a water-wheel there, has not been preserved; it was ruthlessly thrown away on to the scrap heap when dismantled, to make room for a larger engine, viz., "Old Bess," as it was called, which the author well remembers seeing as a lad. His late friend, Mr. Bennett Woodcroft, who had charge of the Patent Office Museum, did all he could to obtain some portions of the first engine, but failed. He was a man who would have done much more for science had he not been greatly hampered in his work, but it is to be hoped that the Patent Office Museum will in future be the receptacle of many good models of successful inventions, and be, in fact, a museum of re-

ference. But to return to the history of the inventions we are following. Watt says in a very few but distinct words that the condenser "ought to be kept cold" "by application of water or other cold bodies." He does not say by injection of cold water, neither does he say in words by surface condensation, but it is clear that if the condenser is "kept cold" by the application of cold water outside of it, it is in fact a surface condenser, and some books state that he held on to the idea of surface condensation, and persevered in it to considerable extent, until his condensers got rather unmanageable in size. It will presently be seen how he met this difficulty by an excellent surface condenser, but it is certain that he gradually used more and more injection as a matter of practice. It is a curious fact that Watt's most important patent, viz., his first one of 1760, has no drawings at all attached to the specification, but his claims are very clearly stated.

With regard to maintaining a vacuum in the condenser, as every cubic inch of steam takes over a cubic inch or more of air, and as Watt had no "sniffing-valve" like Newcomen's, he required something to take out such air as entered his condenser, together with the injection water, if any, and the condensed steam; and he says very shortly, "Thirdly, whatever air or other elastic vapor is not condensed by the cold of the condenser, and may impede the working of the engine, is to be drawn out of the steam vessels or condensers by means of pumps wrought by the engines themselves or otherwise." Thus we have the beautiful invention of the air-pump to maintain the vacuum in an engine by removing the air.

Fig. 3 is a drawing of perhaps one of the most interesting models of the whole collection, next to those showing the condensation of steam in a separate vessel or condenser by means of an injection of cold water, as this model shows the condensation of steam in a separate vessel, or surface condenser, composed of a large number of small vertical tubes with the cold water in them and the steam outside them, which is the best arrangement. It is provided with an air-pump. There are 139 small vertical tubes, and if they are taken to represent tubes about $\frac{1}{2}$ inch in diameter, they would be about 5 feet long. They are, in the model, soldered into the tube-plates at top and bottom. One very remarkable thing about this model, which was suspected by the author before the model was taken to pieces, is that the vertical air-pump has a valve in it.

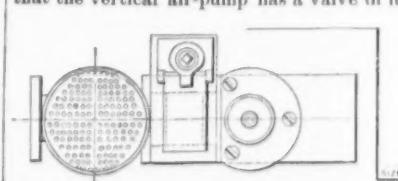


Fig. 5.—Top View of Surface Condenser (Fig. 3).

and is worked very much in the same excellent manner that our best horizontal air-pumps of marine engines now work, viz., to move (or "see-saw") the water from the inlet valve up to the delivery valve, thus insuring the delivery first of all of the air on the top of the water, and then of the water that has to follow the air, so that no air may be left in the air-pump. It is to be wished that all modern air-pumps were made as perfect in their action as this one. This is a remarkable case of a first inventor making an apparatus almost perfect at once, though Watt did not make many of these surface condensers, probably from the expense attending them. Then follow, in the 1769 patent, clauses for a high-pressure engine to work without a vacuum when water is scarce, the steam being discharged into the open air after it has done "its office." It is certainly to be regretted that Watt never followed up the use of high-pressure steam, as no doubt he would have accomplished much more and have made more powerful engines in smaller compass; but he left a great deal of this to Trevithick to accomplish, though he objected strongly to Trevithick or Bull using a separate vessel for condensation. In this first patent Watt had other claims for a kind of rotary steam water-wheel, also for a caloric engine, and for using "oils, wax, resinous bodies, fat of animals, quicksilver and other metals, in their fluid state, to make pistons air and steam tight, but we have no models of such schemes. Many of his letters prove that he used oil on the piston and pumped it up to use over again, and then he complained that a quantity went away with the condensed steam and was lost. Some piston packings were of pasteboard, soaked in oil and baked, and some of cork; but they did not follow the bad cylinders well, and it would seem to us now that it was a pity he did not insist upon having a good cylinder, truly bored out, much earlier.

It is worthy of note that in a letter to a friend he said that he thought he had got his cylinder bored so perfectly that you could not get half-a-crown between the piston and the cylinder anywhere. Now, we must not be altogether surprised at this remark, when we consider with what materials he was in the habit of making his models. He used tin cylinders and soldered joints in many

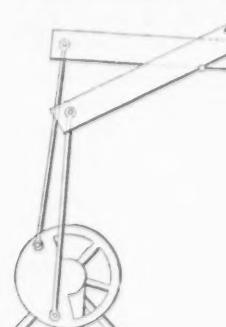


Fig. 4.—Disk with Crank-Pins, 1781.

and causing the piston to come down by the pressure of the atmosphere on the top of the piston, while great leakage of air past the piston was prevented by the fact that there were several inches of water on it. The cylinder, of course, was very considerably cooled by the operation. There was no air-pump to such engines, but when the piston had made its down stroke or "gone indoors," there was the condensing water and condensed steam, with what air there might be, in the cylinder; then, instead of this being taken out by an air-pump, it was expelled, through a small valve called a "sniffing-valve" at the side of the cylinder, close to the bottom, by the fresh steam when it

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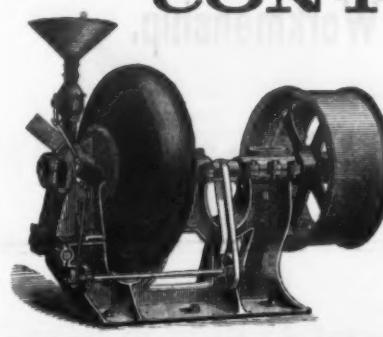
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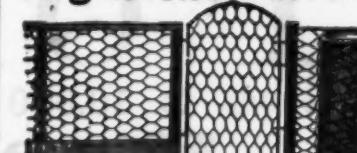
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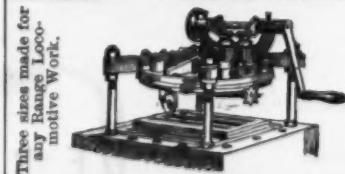
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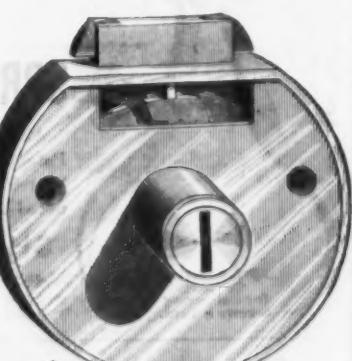
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cases, and in one letter he says the cylinder was not very true, as it had not been bored, but was hammered; and in another letter he says that he shall in future make his cylinders of copper, as though that was a great improvement upon the material he had been using.

He speaks of his "White Iron Man," who was so useful, being dead, meaning his "Tin-Man," but it does seem sad that a block-tin cylinder that he used, 18 inches in diameter and $\frac{1}{4}$ inch thick, should be $\frac{3}{4}$ inch out of truth, and he speaks of trying to improve it by hammering it with a mallet outside, on a piece of wood fitted to the inside. It is curious to think of an optician and mathematician spending time over such imperfect work.

His partner, Boulton, one day writes to Watt, who was away, that he had put in hand a block or boring head, to bore a cast-iron cylinder then in hand, probably one $7\frac{1}{2}$ inches in diameter. However, it does not do always to think lightly of others' work, unless we are sure of our ground ourselves. It is possible that there may be a few present who are not aware that if any ordinary cast iron cylinder of good size is bored horizontally, it is not fit to be used vertically, or vice versa, as it springs very perceptibly out of round with its own weight, independently of the strain of any chains that may be used to fix it while boring. This was tried by the author in 1815, and again lately, and it is evident that different parts will spring differently, according to their stiffness and size of flanges, &c. Fig. 1, taken from "Stuart's History of the Steam Engine," is in fact one of Watt's earliest pumping engines, single-acting, without a fly-wheel or any rotary motion, but with steam jacket to keep the cylinder warm, and a separate condenser to condense the steam without cooling the cylinder; with an injection-pipe and an air-pump, but no parallel motion, there being segments on the ends of the beam, commonly called "horse-heads" in those days. Now, an open topped cylinder is shown in his 1781 patent, and a stuffing-box to the cylinder-cover in his 1782 patent; but it appears from Watt's notes to Robison's article on steam and steam engines, written for the "Encyclopaedia Britannica," that Watt, even by 1774, had closed the cylinder at top, and put a stuffing-box for the piston-rod to pass through.

The useful effect of so doing in a single-acting pumping engine is to exclude the atmospheric air from the cylinder, and let the steam act on the top of the piston when there is a vacuum below the piston and it is making its stroke "indoors"; then, when the piston is about to rise or go "outdoors," the steam on the top of the piston is allowed to pass to the bottom through a valve, called the "equilibrium valve," and, when the piston has risen, this steam is let out into the condenser, and fresh steam is allowed to flow on to the top of the piston. In this way the cylinder never has any air admitted inside it. This was a grand improvement on Newcomen's engine, for less steam was required to do a given duty in pumping, and the engine could be worked much quicker, as no time was lost in heating up the cylinder and cooling it down again to obtain a vacuum. The time required for a stroke was simply the time the steam took to flow through the passages and the water to move through the pump. A noticeable feature in most of the models is the absence of anything like a large condenser or separate "vessel" for condensation, as in most cases the injection-pipe is shown throwing its water up the ejection-pipe, so as to meet the steam coming from the cylinder to the air-pump, thus making the pipe itself into the condenser. In Watt's patent of 1781 a number of very ingenious contrivances for converting the reciprocating motion of the piston into a continuous rotary motion are shown and described, though it must be at once freely admitted that none of them are so good as a common crank.

It appears that a man of the name of J. Pickard in 1780 took out a patent simply for the one object of converting reciprocating to rotary motion in a steam engine by means of a crank, and it has been said (but the author cannot say with what truth) that he was a workman of Watt's, who learned that Watt had invented such a mode, and then went himself and patented it; it has further been said that Watt would not attempt to make any terms with the man, and would not run the risk of a lawsuit. However, in the specification to the patent of 1781, Watt shows both a single crank and two cranks at right angles, having connecting-rods to them to enable the two engines to work on one crank-shaft. These cranks are pins in disks, and are not called cranks in the specification, but "points of attachment of the connecting-rods;" this would seem to be a distinction without a difference. See Fig. 4.

The model now exhibited is a model of an engine made according to Watt's patent of 1781; it is single-acting, and has an open-topped cylinder with air-pump, condenser and heavy balance weight on the connecting-rod, to give the impulse in one direction, while the piston at the other end of the beam gives the impulse in the other direction by means of the vacuum then produced in the cylinder, thus obtaining rotative motion. This model has been kindly sent here by Mr. E. B. Marten for exhibition. The next best plan is the well-known "sun-and-planet" motion, in which a spur-wheel, rigidly fixed on the connecting-rod, gears into a spur-wheel on the engine shaft, and is kept in gear with it by a pin or roller behind the center of the pinion, running in a circular chase or groove provided for it. Another plan of keeping the wheels in gear which has often been adopted is that of a link having one end turning freely on the engine shaft, while the other end confines the center pin of the spur-wheel fixed on the connecting-rod. The author has had to make some alterations in one of these engines within a very few years; it is only a "stand-by" engine, but is occasionally worked, and goes very well when the mortise pinion has been recently re-gearred. Of course, the engine shaft goes double the speed of an engine with a crank. An actual engine of this type is now preserved at the Patent Office Museum.

Another form of "sun-and-planet" motion is one in which the "planet" spur-wheel is an internally-gearred wheel, and is kept in gear by means of a roller at the lower end of the connecting-rod, running around an oval-shaped cam or guide-block. Another model

shows a "spur planet" on the connecting-rod, and internal gear on the shaft. Then there are two forms of eccentrics on shafts, one a solid one, with an eccentric-rod embracing it, but provided with rollers to bear against the eccentric to reduce friction, Fig. 5, and the other a hollow eccentric, with the end of the eccentric-rod fitting inside it, but provided with a roller to reduce friction.

(To be continued.)

Separating Rhea Fiber.

A number of machines have been patented in England for the separation of rhea fiber, so that it might be used in the manufacture of textile fabrics. The latest and most approved form of these machines is the invention of Mr. H. C. Smith, and consists of an iron framing about 3 feet high, 2 feet wide and 3 feet deep from front to back, carrying a revolving drum about 18 inches in diameter and 12 inches wide. The drum is fitted with a series of beaters which pass near to the edge of a small feeding table about 12 inches wide, the drum being covered in with an iron hood. From beneath the feeding table a thin sheet of water is made to play in a constant stream against the drum at a certain pressure and angle, and this constitutes the whole of the apparatus. The fibrous plants are fed in by hand on the feeding table, and are simply held up to the beaters by a cushion or backing of water, by which means the whole of the extraneous matter is removed and the fiber produced in a remarkably short time and in excellent condition.

The machine was invented about a year ago, and some specimens of it have been made and sent to India, where they are now doing good work upon various kinds of fibrous plants. It does not, however, appear to have hitherto occurred to any one to try the effect of the machine in preparing the fiber of the rhea plant. This was probably on account of the woody nature of the rhea stalk, which, it might be assumed, would cause damage to the fiber if the stalk were beaten in a machine running at a high velocity. Not long ago, however, the machine was tried with rhea stalks, with the most satisfactory results.

The experiments consisted primarily in the treatment of some rhea grown in England, as well as other stalks of rhea grown in France. It should be observed that in practice the rhea should be treated freshly cut and in its green and juicy condition. In the present instance, however, the English stalks were cut on the 30th of October, and although they had been, as far as possible, preserved green, they were not, of course, in a condition to justify the expectation of the best results. Nevertheless, they were all successfully treated, the fiber coming out much better than had been anticipated. In one of the tests 115 stems of the French rhea were treated by the operator, and the fiber produced clean and free from all adherent particles in $3\frac{1}{4}$ minutes. Besides the foregoing, several varieties of fibrous plants were put through the machine, including the *Fourcroya gigantea*, an India aloe, the *Sansevieria Zeylandica*, or bowstring hemp, as it is called by the natives, the *yucca* and the *phormium tenax*, or New Zealand flax. All these were successfully treated, and considering that none of them were freshly cut, and that, moreover, they were garden specimens of the various species, the fiber left the machine in a clean and satisfactory condition. On the whole, it may be reasonably assumed that the problem of the mechanical preparation of rhea fiber has been solved, and that the prospects of the utilization of this valuable, but hitherto useless, plant are now fairly established. The invention is at present in the hands of Mr. C. E. Collyer, of 441 Fenchurch street, London.

Progress of the Basic Process.

During the last year the progress made by the Thomas-Gilchrist process, says the *Ironmonger*, has been fully maintained, both in England and on the Continent. In England the Northeastern Steel Company, Middlesbrough, commenced in last June with four rotaries, and are now fully at work, regularly producing both rails and soft material, of which the average composition is: Carbon, from .12 to .15 per cent.; sulphur, under .05 per cent.; phosphorus, under .04 per cent.; manganese, under .4 per cent., with a tensile strength of 54,000 pounds, and an elongation of 24 per cent., the scrap from which is piled up either by itself or in admixture with iron scrap. In addition to rails, the basic steel has been largely employed for the production of soft metal for conversion into plates, sheets, tubes, sleepers, angles and wire, which latter, from its great purity, has been employed for electrical purposes. The total output of Thomas-Gilchrist Bessemer and Siemens steel for the year ending September 30, 1883, was 634,373 tons, of which the different countries contributed as follows: England, 122,380 tons; France and Belgium, 67,106 tons; Germany and Austria, 410,052 tons; other countries (including America), 34,835 tons. The make for the month of October last is estimated at about 64,000 tons.

Explosion in a Coal Mine.—An explosion occurred at 8 o'clock on the morning of January 24, in the coal mine of the Colorado Coal and Iron Company, at Crested Butte, Gunnison County, Col., by which some 60 miners lost their lives. There were 67 men in the mine at the time of the explosion. Of these, 11, who were just entering, were thrown back by the force of the explosion, all being badly injured. The explosion was of such force as to wreck the engine-house, which stood fully 100 feet from the entrance to the mine. The accident is supposed to have been caused by a disobedience of orders by one of the miners. The mine carpenter, having discovered that there was gas in one of the chambers, ordered the men not to go into it. Immediately after his coming out the explosion occurred, and it is believed that one or more of the men must have ventured into the mine with lights.

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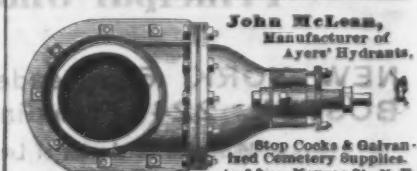
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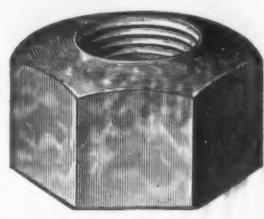
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This work, though necessarily in great measure of a special nature, since it relates to but one of the many industries in the United States, yet contains a mass of statistics and general information which is of great value to all who are interested in the condition of the manufactures and the prosperity of the producing classes. The book in question, which was compiled for the Census Bureau, gives a very complete synopsis of the glass industry in this country, it being supplemental to—or, rather, fuller report than—the one published in 1881. The tables given in the first chapter of the work contain all the important data relating to the glass factories in each and every State, and the statistics referring to their condition in the year 1880. The next seven chapters give very fully and in considerable detail the chemical composition of the various glasses, the sand alkalies and other material used in their manufacture, the furnaces and apparatus employed, and the methods of glass-making, including processes of melting and the manner of fashioning special forms and producing peculiar kinds. The remainder of the work is devoted to a history of glass and its manufacture, both ancient and modern. Under this head it may be noticed that the author ascribes the invention of glass-making to the Egyptians, and intimates that it was probably the slags formed in some metallurgical operation that first drew attention to the subject. The total value of the glass produced in the United States in 1880 is estimated at \$21,000,000, Pennsylvania leading with 78 works and an output valued at nearly \$9,000,000.

MECHANICS. By John W. Nystrom. Size, 3 $\frac{1}{2}$ x 6 $\frac{1}{2}$ inches; 511 pages. Published by Messrs. J. B. Lippincott & Co. Price, \$3.50.

The seventeenth edition of Mr. Nystrom's pocket-book, which for years past has taken a prominent position in that class of literature, has just reached us, and, besides the usual quantity of interesting and valuable matter, contains some important additions. Among the matter which has been added is that relating to the standard pitch of gear-wheels, with a table by means of which the correct pitch and diameter and the pitch-line for any number of teeth between 6 and 245 can be found by one single multiplication. It is known that the pitch should be measured in the chord, and not in the arc of the pitch-circle, for which the tables of circumferences for calculating the pitch and diameter of the gearing will not answer. The subject of belting and cone pulleys is treated very extensively, occupying seven pages, and embraces a handsome engraving. The formulas for belting are new, and claimed to be absolutely correct. The new belting table gives at a glance, without calculation, the proportion of the motive force, pulling tension and the pressure in the journals for any angle of contact of the belt on the smallest pulley between 60° and 250°. The article on cone pulleys is substantially the same as that which was published in Vol. I of Mechanics. The table of simple elements on page 470 gives both the old and the new equivalents, together with brief descriptive remarks relating to each one. The formulas for binary compounds are given, with their new equivalents, and are similarly treated as regards other points. Throughout the pocket-book improvements and corrections have been made, and there can be no question that in its new form it will meet with even greater favor than that which it has received during the past.

ELECTRICITY AND ELECTRICAL ENGINEERING. By Lieut. Bradley A. Fiske, U. S. N. Size, 6 x 9 $\frac{1}{2}$ inches; 270 pages. Published by D. Van Nostrand. Price, \$2.50.

Lieutenant Fiske's work, a copy of which reached us a short time since, is designed to form a bridge between the many works on the theory of electricity and those of its practical application. The relation of the two has been made difficult to understand, because the theory was studied from books devoted wholly to abstruse questions, and the practical application from books devoted wholly to that purpose. Explanation of the theory of the practical applications has been the end aimed at by the author. The book comprises 28 chapters, treating of frictional electricity, voltaic batteries, storage batteries, thermoelectric batteries, electrical measurements and all other branches directly connected with the subject. Throughout the work the author has attempted—and has to a great extent succeeded—to present the matter in an exceedingly simple and attractive form, and the average reader will find it instructive and valuable in many respects. Quite a good deal of matter has been taken from the leading electrical journals, the cuts in many instances coming from the same source, and in others being those of manufacturers of electrical appliances. An exceedingly interesting chapter is devoted to electric railways, describing the two general systems of electric propulsion, and giving a number of single and double page engravings of the different electric railways now in operation.

Chinese Progress.—From a commercial standpoint, as well as to some extent from a political point of view, says the *Ironmonger*, some jottings just to hand from one of our correspondents in China are of considerable interest. It is now about five years since the first 40-pounder gun was turned out at the Kiangnan arsenal, near Shanghai. In the interval a large number of 40, 50 and 120 pounders have been manufactured there, and still larger guns are said to be in contemplation. It is understood that the whole of these cannons are constructed upon Sir William Armstrong's coil system, the work being done on the spot by native workmen with only one European superintendent. The raw materials are all received from England at present, but there are good reasons for believing that no long time will elapse before the native materials will be used—just as the fuel is already raised from the native coal pits. The Chinese workmen make singularly adept mechanics, and are turning out machines which would do no discredit to Western shops. They have constructed the entire plant needed for the

manufacture of powder for the Government, as well as a large number of lathes for the arsenal, besides other machinery and machine tools, which are said to do the work required of them in a satisfactory manner. In addition to being an excellent and docile mechanic, the Chinaman is about to try his skill as a shipbuilder. The first of ten corvettes, to be built of steel and iron, has been commenced. Each of these vessels will have 1400 tons displacement, and the whole of the ten will be absolutely built and finished by Chinese workmen. Even the engines and boilers will be made and fitted on the spot, and will be of the most approved types. These facts, selected from a number of the same kind, serve to show that China is not standing still, but is making progress which, if continued, may some day revolutionize the present conditions of trade in the Far East.

New Inventions.

Henry M. Wyeth, of Salt Lake City, Utah, is the inventor of a force-pump in which the cylinder is made of a square block of wood of suitable dimensions, bored longitudinally in the direction of the grain, and then split into two pieces. The ends of the pieces are grooved to receive the heads, the upper head having an opening for the plunger-rod. The two sections of the cylinder are joined, and are connected to a flat block, somewhat longer than the cylinder, and attached to one side of one of the cylinder halves. This block has a longitudinal bore extending entirely through it, one end being the water inlet and the other the outlet. The bore communicates with valve chambers with the cylinder above and below the piston. The water enters the block at its inlet, passes into the cylinder, and is thence forced out of the block outlet.

A regenerator for hot-blast stoves has been patented by F. W. Gorden, of Pittsburgh, Pa. Such stoves are ordinarily built to a height of 60 or 80 feet, and with this partition walls between the flues. Any derangement of the brickwork, due to warpage, &c., sometimes results in the tumbling down of part of the walls, and frequently the displacement of a single brick will result in clogging a flue. The flues are inclosed by two series of walls which cross each other at right angles. The inventor claims as an improvement that he uses bricks of a width equal to the thickness of the walls and having a length equal to the width of the flue, plus one-half of the thickness of the walls. Each brick has thus one end abutting against the end of another brick and the other end against the side joint of two abutting bricks. Thus each brick reaches across the flue and half-way into the flue wall, and the brick, even if loose, cannot be so displaced as to fall into the flue.

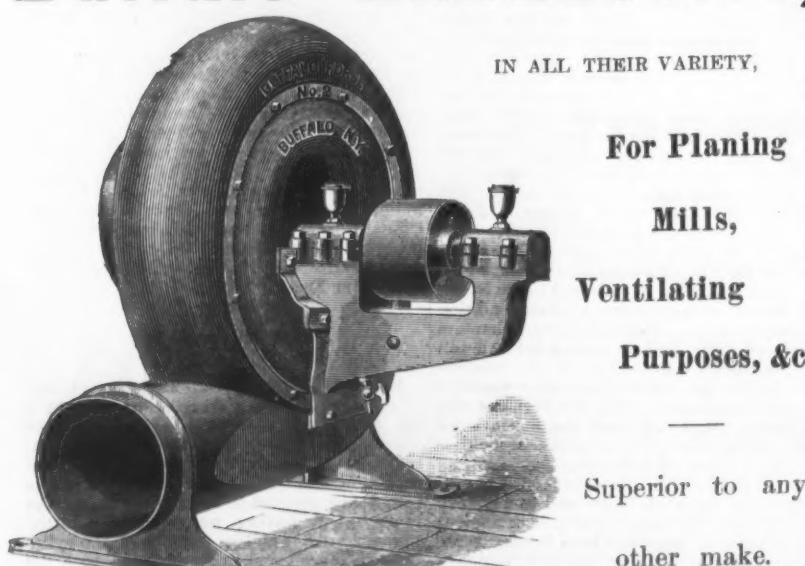
A new coke oven, in which, in case of interruption of the operation, some coke shafts may be thrown out, and each separate coke shaft utilized as a generator, has been patented by H. Stier, of Zwickau, Germany. The coke shafts are surrounded by the heating shafts, so as to isolate the former. The coke shafts have an opening at the top and at the bottom, while the heating shafts are provided with openings in their walls, through which the heating gases may pass. Generators are placed on the outside of the plant, and inclose between them a channel which carries off the products of combustion. The heating gases passing through the generator are mixed with air, enter the heating chambers, and finally escape through proper funnels. The vapors and products of distillation developed in the coke chambers pass into a condenser, while the lighter non-condensable gases pass into a main gas channel, from whence they may again be utilized for heating the coke chamber.

The objects of a patent taken out by A. M. G. Sébillot, of Paris, France, is to provide a means by which metallic zinc may be obtained in blast furnaces from ores containing zinc mixed with iron and other metals. The blast furnace, which is constructed in the usual manner, is provided with two outlet-pipes for the gases, one at both top and bottom. The upper pipe conveys the gases from the furnace into a condensing chamber divided into a series of compartments, and provided with an exhausting fan. The lower pipe, which is subject to the most intense heat, is connected with a chamber filled with charcoal, through which the gases must pass. The charcoal is kept at a red-heat by the gases passing through, and converts the carbonic acid into carbonic oxide, leaving the vapors of zinc free from carbonic acid. These vapors are condensed, and the molten or liquid zinc collects in a chamber, from which it can be drawn by means of a cock. This method has been designed to overcome the difficulty which has heretofore been encountered—that the vapors of zinc are converted into oxide of zinc by the presence of even the smallest quantity of carbonic acid.

A clevis for coupling the forward axle of a farm wagon to the limber tongue of a grain binder truck has been patented by R. Hamilton, of Franklin, Ind. The clevis, in the form of a staple, has the upper horizontal arm longer than the lower arm. The two arms are placed at a distance apart, so as to straddle the axle of the farm wagon. The upright side of the clevis is at its top bent outwardly, and to the offset thus formed is attached the tongue of the truck. By this construction the tongue is held in place above the slide-bar of the wagon.

A spring hinge for doors opening in both directions forms the subject of a patent granted to W. Duncan and the Union Brass Manufacturing Company, of Chicago, Ill. The invention is designed to provide an arrangement whereby the tension of the coiled spring can be changed when applied to doors of different weight. The upper end of the spring is attached to a rod, which is incased in a cylindrical spindle. Both rod and spindle are provided with a series of radial holes in the same horizontal plane. By turning the rod in either direction the ten-

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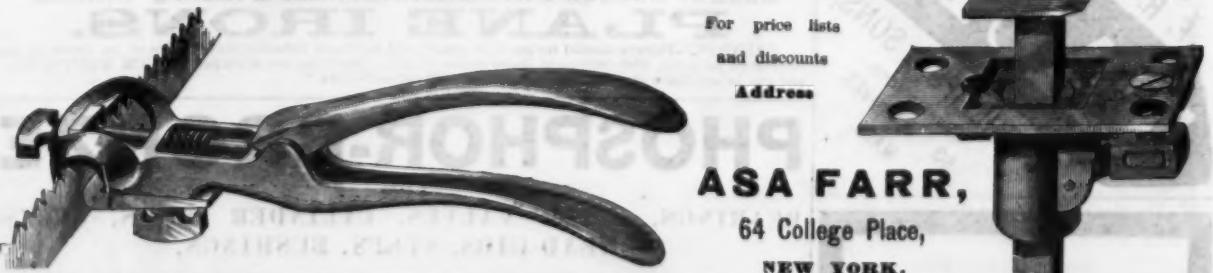
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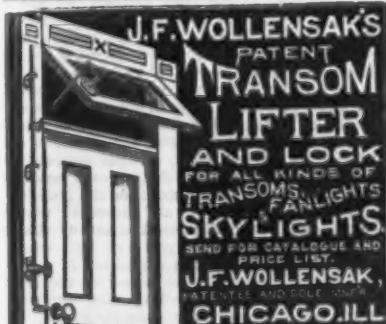
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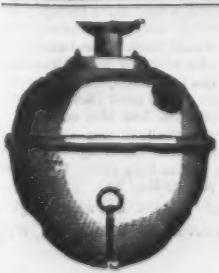
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sion of the spring is increased or diminished. The rod may be locked in any position by a pin passing through one of its holes and entering one of the holes of the spindle.

A socket for barrels or other receptacles from which liquids are drawn through faucets has been patented by F. G. Kincaid, of Somerville, and C. A. Chamber, of East Bridgewater, Mass. The socket is a hollow sleeve screw threaded at its interior of a size to fit into the tap-hole. A valve disk having a screw-threaded hollow shank enters the socket and closes against the inner end of the same. When the faucet is inserted it will, by engaging lips, unscrew the valve shanks and cause the valve disk to recede. Thus liquid is admitted to the faucet. When, however, the latter is to be withdrawn, it will, on being unscrewed, draw the valve disk against the end of the socket, and thereby close it. In this way the escape of liquid is prevented during the insertion and removal of the faucet.

A new device for packing table knives in dozens, or other suitable quantities, so as to present the goods in a neat and attractive style, forms the subject of a patent issued to G. E. Felch, of Ayer, Mass. This knifeholder is composed of two disks of pasteboard, leather or any other suitable material, connected by a central rod or bar and provided with radial slots or sockets. The slots in each disk alternate in size, so that six narrow or blade slots and six wide or handle slots are formed. The distance between the disks is such that a knife can rest at one end in a socket of one disk, and at its opposite end in a socket of the other disk. The radial arrangement of the sockets enables the knives to be held in a circular series, occupying comparatively small space, and adapted to be placed in a cylindrical box.

F. S. Hoyt and P. D. Storch, of Chicago, Ill., have constructed a machine for holding broom sockets while being wound, the machine being intended especially for that class of brooms in which the head is secured to the sockets before the handle is applied. The inventors use a hollow mandrel or tube slotted at one end, so as to spring together, within which the follower plays. The workman first draws back the follower, allowing the slotted end of the mandrel to spring together. The broom socket is then placed over this end, and the follower is pushed forward, extending the mandrel and causing it to tightly hold the socket. The broom wire being secured in one of the small notches of the mandrel is made to form the broom head, and is wired upon the socket in the usual manner. When completed, the follower is withdrawn, releasing the socket, which is now ready to receive the handle.

A novelty in scissors and shears has been patented by S. R. Plumb, of Cheshire, Conn. The blades and handles are made in separate pieces, the blades being pivoted together a short distance from one end. The handles are also pivoted together, and are then placed behind the pivot of the blades. The rear extension of each blade is then pivoted to one of the handles. Thus the shears work on two pivots—the handle pivot and the blade pivot. It is claimed that in this way the power of the implement is greatly increased. The blades operate like those of an ordinary pair of shears, but with the additional leverage.

WASHINGTON NEWS.

HOUSE FOREIGN AFFAIRS COMMITTEE.

January 23.—The House Committee on Foreign Affairs informally discussed measures relating to the Isthmian Canal, and determined that formal consideration of that subject would be given at an early day. The incidental expression of opinion indicated that a strong enunciation of the Monroe doctrine will be the ultimate result of the committee's deliberations. It is understood that Representatives Curtin, Belmont and Rice will be made a sub-committee to consider the subject. The Canadian Reciprocity Treaty was referred to Messrs. Belmont and Hitt.

THE HAWAIIAN TREATY.

January 23.—The Senate Committee on Foreign Relations this morning ordered an adverse report upon the resolutions introduced by Senators Jonas and Gibson requesting the President to take the necessary steps to terminate the Hawaiian Reciprocity Treaty. A minority of the committee will report in favor of the resolutions.

COPYRIGHTS FOR FOREIGNERS.

January 23.—Messrs. Dorsheimer, Culbertson and Poland, of the House Committee on the Judiciary, to-day recommended to the full committee the passage of the Dorsheimer bill, with certain amendments, which grants copyrights to citizens of foreign countries. The bill grants the privilege of copyright to citizens of foreign countries for 25 years when like privileges are granted to American citizens. The amendments offered extend the time to 28 years, with a right of renewal of 14 years.

AMERICAN SHIPPING INTERESTS.

January 24.—Representative O'Neill, of Pennsylvania, introduced in the House to-day a bill "To Encourage the American Merchant Marine," and it was referred to the special Shipping Committee. This is the bill recommended by the Philadelphia Maritime Exchange, and provides that all American built and registered vessels sailing to foreign ports, by giving ten days' notice to the Postmaster-General, shall take whatever mail matter there may be for that port and be paid 25 cents for each registered ton for every 1000 miles run by steamers and 15 cents for sailing vessels, the act to go into force January 1, 1885.

The Senate Committee on Commerce continued the consideration of the shipping bill this morning. The proposition to allow ships to purchase stores from bonded warehouses without payment of duty, and to give a drawback upon materials entering into the construction of vessels built in the United States on foreign account, were approved.

TARIFF SPECULATIONS.

January 27.—According to the Republican members of the Ways and Means Committee,

the subject of tariff legislation has not been broached in any meeting of the committee since it was organized, nor have they received any intimation from Chairman Morrison or other Democratic members of the committee as to what are the purposes of the majority. They have heard several rumors, but nothing definite. One rumor is that Colonel Morrison has concluded to present a bill providing for a "horizontal" reduction of duties on articles included in a number of schedules of the tariff law, and for the transfer to the free list of several important articles upon which duties are now imposed. The Republicans understand that the chairman will aim at an average reduction of about 20 per cent., taking the entire dutiable list into consideration. As they do not expect he will propose a reduction on wines and liquors, tobacco, silk and silk goods and some other schedules, they believe that on some of them—say, cotton goods, metals and woolen goods—the reduction proposed will exceed 20 per cent. Among the articles which they believe he will ask to have placed on the free list are salt, lumber and iron ore.

MEASURES BEFORE THE HOUSE.

January 27.—The two or three appropriation bills which were promised three weeks ago have not made their appearance in the House, and, in fact, are not yet out of the hands of the sub-committee on Appropriations. The shipping bill recently reported from the Select Committee on Shipping is perhaps the most important measure before the House, and it is expected that a motion will shortly be made by General Slocum to proceed to its consideration in committee of the whole.

CUSTOMS DECISIONS BY THE TREASURY DEPARTMENT.

January 29.—The following is a synopsis of the decisions rendered by the Treasury Department in customs cases during the past week, so far as they relate to metals: Metal puff boxes, light in weight, the bodies of which were composed principally of pewter and lead, and forming a substance analogous to Britannia ware, and the bottoms composed of zinc—held to be dutiable under Paragraph 210 for Britannia ware. (Letter to Collector of Customs at Baltimore.) On the trial of the suit of Scott against McClung, in the United States Circuit Court at Cincinnati, involving duties on corrugated sheet iron, the article was held to be dutiable at 35 per cent. ad valorem, as a manufacture of iron not otherwise provided for under the tariff act of June 22, 1874. The department has acquiesced in the decision. (Letter to the Surveyor of Customs at Cincinnati.) Iron show cards, intended for distribution and claimed to be dutiable under Paragraph 384, for all printed matter—held to be dutiable as a manufacture of iron at 45 per cent. ad valorem, the provision for printed matter in Paragraph 384, which is in the paper schedule, including only printed articles of paper. (Letter to the Collector of Customs at Boston.) Drawn steel wire, larger than No. 5 wire gauze—held to be dutiable at 45 per cent. ad valorem, under Paragraph 210, for manufactures composed of steel, and not at 3/4 cents per pound, under Paragraph 177, as steel in billets or bars. (Letter to the Collector of Customs at Chicago.)

SUNDRIES.

January 29, 1884.—The Senate to-day passed the House bill making an appropriation of \$3,750,000, or so much thereof as may be necessary, to supply deficiencies on account of appropriations for the fiscal year ending June 30, 1884, in regard to the rebate of tax on tobacco, and to provide for the meeting of the Legislature of New Mexico, for which last-named purpose \$21,965 is appropriated.

Representative Morrison, chairman of the Ways and Means Committee, has completed a tariff bill, but will not introduce it in the House until other members of the committee have had an opportunity to consider it and offer suggestions. As prepared, the bill provides for a general horizontal reduction of 20 per cent., but in no event is the reduction to be lower than the tariff rates in the Morrill bill of 1861.

Mr. Harris, president, and Mr. Gray, general solicitor, of the Northern Pacific Railroad Company, made arguments before the House Committee on Public Lands, to-day, against the forfeiture of the land grant of that road. Members of the committee say that bill will be reported declaring forfeited all the land along the portion of the line which was not completed within the time specified in the granting act.

At a meeting of the House Committee on Banking and Currency, to-day, the resolution of Representative Hunt, of Louisiana, was adopted by a vote of 8 to 4. Those opposing were Messrs. Buckner, Miller, of Texas, Yaple and Brunin. The resolution declares it to be the sense of the committee "that the public welfare demands that the benefits of the national banking system be substantially preserved and continued for the time being, provided that this resolution shall not be construed to be a declaration in favor of the perpetuation of the public debt."

SOME NEW HOUSE BILLS.

January 29.—Among new bills introduced in the House to-day were the following: To prevent the employment of operatives on railway trains more than 12 hours out of 24; providing for inspection and certification of meat products for exportation; to reduce the tariff rates on different grades of sugar; to reduce the duty on woolen goods, flannels, blankets, women's and children's dress goods and ready-made clothing; to prevent the adulteration of sugar and molasses; to reduce duties on goods on shipboard when the tariff act of 1883 went into effect; granting permission to dig for treasure and minerals on the Government lands at West Point; to alter the mode of collecting internal revenue tax.

The repeated failures of Colonel Paine's grip on the Brooklyn Bridge have already materially affected the Patent-Office records, and applications for patents on grips are now coming in regularly from week to week. It would seem, in fact, as though the near future would usher in an array of patent grips that will leave car couplers, low-water alarms, electric appliances, and other devices now popular with inventors, entirely in the background.

The Iron Age

AND
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New York, Thursday, January 31, 1884.

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The Condition of Business.

Considering the season and the severity of the weather, the volume of business in iron and steel reported to us for this vicinity has been quite fair during the past week. Some houses, it must be stated, are doing less than usual, and are disposed to complain of the situation; but others are doing more, so that, though activity is by no means universal, neither is dullness prevalent. In steel rails one company reports transactions aggregating 30,000 tons, while the other companies, almost without exception, have found matters quiet and inquiries few. The situation of pig iron is about as it has been; in some quarters business is very satisfactory, and orders are daily received for large lots, while in other directions the sales made are only of an ordinary character. In manufactured iron there is a little more activity, but it is not general. The merchant-steel trade is looking up a little in volume, but in other respects it is not satisfactory, as competition is growing more keen in special lines.

Prices generally are about as they have been for some time past. Steel rails are held at \$34 at mill in Eastern Pennsylvania, but it would be difficult to place an order for spring delivery with the companies which quote this price, as they are understood to have all the work they can possibly turn out in the spring and early summer months. Pig iron shows no change in price, but the companies which have been selling at the lowest rates will, it is intimated, shortly advance their prices slightly. Bar iron is held more firmly, and concessions are rare on first-class grades of best refined. Other kinds of manufactured iron command the prices which have been ruling for some time, though occasionally we hear of offers of sheet iron by Western mills at rates slightly under the local figures. Steel plates are the subject of active competition, and some makers are offering lower prices than any which have heretofore been quoted. Small lots of steel rails and planished sheet iron have been sold for export, the former to go to Cuba and the latter to England.

In order to keep up with the progress of the times, and to be thoroughly informed as to the state of an art in any department of manufactures, it is necessary to give attention to the numerous patents which are being issued from week to week. It is proverbial that only one in a very large number of the patents which are taken out ever becomes remunerative; but it still re-

mains that a careful study of the Patent Office records will furnish a fund of information that is hardly to be obtained in any other direction. Some insignificant and almost worthless ideas which may be patented by an obscure inventor frequently suggests something of real merit in the mind of one who is more closely connected with the active work of the age in the particular direction indicated. Hence the importance of a regular and systematic inspection of Patent Office records upon the part of those in any division of the mechanical trades who desire to keep abreast of the progress of the times. Our readers will find in our columns from week to week some of the more important current inventions in the line of mechanics, and also notices of miscellaneous inventions of general interest. These short paragraphs are not among the least interesting and valuable portions of our weekly issues.

Stocks of Domestic Pig Iron on January 1.

Makers' stocks of unsold pig iron have fluctuated during the past twelve months very considerably, according to the several statements issued by the American Iron and Steel Association. On the 1st of January, 1883, the stocks aggregated 383,655 gross tons of all kinds of pig iron, scattered all over the United States. In the next six months there was an increase in stocks of 144,935 gross tons, the statement for the 1st of July showing 528,590 tons. In the following four months the production of pig iron was sufficiently restricted to cause a decrease in stocks of 96,237 tons, the statement for the 1st of November showing 432,353 tons. In the last two months of the year the consumption of pig iron fell off faster than the decrease in production, and stocks increased 44,254 tons, the statement for the 1st of January of this year showing 476,607 tons. Taking the range of the whole twelve months, there was a net increase in stocks of 92,952 tons of all kinds of pig iron. This increase in stocks would be rather discouraging if the details did not show some results of a much more cheerful character.

It is well known that in the past four years the production of charcoal pig iron has been exceptionally large in the United States, and the stocks of charcoal pig iron held by the makers have also been excessive. The large stocks of charcoal pig iron swell the total stocks to their present undesirable proportions. Out of a total stock of 383,655 tons on the first of last January, 147,535 tons were charcoal; of 528,590 tons on July 1, 145,756 tons were charcoal; of 432,353 tons on November 1, 145,003 tons were charcoal; and of 476,607 tons on the 1st of the present month, 164,266 tons were charcoal. As charcoal pig iron commands a special field, and there are only certain well-defined localities in the country in which it is used for all purposes, we will separate it from the stocks of other kinds of pig iron, and show how very meagerly the country is at present supplied with the pig iron which it uses the most widely. The following table will exhibit the stocks of anthracite and bituminous pig iron on the four dates we have been comparing:

	Gross tons.		Gross tons.
Jan. 1.	July 1.	Nov. 1.	Jan. 1.
Pig iron.	1883.	1883.	1884.
Anthracite.....	95,767	126,735	158,920
Bituminous.....	140,938	196,099	128,830
Total.....	236,105	322,834	287,850

From this table it will be seen that the stocks of anthracite pig iron are now about the same as they were on the 1st of November, while the stocks of bituminous pig iron have increased, but only about 25,000 tons. There would seem from these figures to have been no increase in stocks in this locality during the latter part of the past year, as no bituminous pig iron is produced very near here. As compared with the 1st of July, there was a decrease of over 70,000 tons in the stocks of anthracite and bituminous pig iron. The manufacturers of pig iron certainly have in the facts here presented good reasons for considering their branch of the iron trade in condition to respond quickly to any symptom of improving business. These stocks comprise all grades, from Bessemer to forge, and, when the vast requirements of the country are considered, it must be admitted that a very slight increase in the demand would cause an apparent scarcity of pig iron. The situation is very different from that of 1873 or 1874. At that time, when consumption was much lighter, stocks were a great deal heavier, and years were required to work off the surplus.

Iron ties will probably have the benefit of another trial on Belgian State railways, a number of Belgian iron manufacturers having petitioned the Minister of Public Works to take favorable action in the matter. The first experiments made with such ties in Belgium were unsatisfactory, but those tests are now claimed as having been inconclusive, the material and arrangement having been such as to preclude the possibility of obtaining favorable results. It is argued in support of such trials that experiments in Germany have proved the value of iron sleepers, and that Government and private contracts for some 20,000 or 30,000 tons are there given out. The facts that Belgium now imports wooden ties, that the adoption of iron ties would in a great measure relieve Belgian iron manufacturers from the difficulty now experienced in finding employment for their men, and that a native industry would thus be greatly benefited, are all cited in behalf

of the movement. Some of the claims are evidently well founded, and the institution of further tests in this direction may consequently be looked forward to with some certainty.

Canadian Reciprocity.

A movement, which promises to be quite strong, has been inaugurated in favor of reciprocity in coal and iron ore between the United States and Canada. Under existing laws, anthracite coal from the United States pays a duty of 50 cents per ton and bituminous coal pays 60 cents per ton to cross the Canadian border, while either coal or iron ore from Canada pays a duty of 75 cents per ton to enter the United States. These duties are regarded with disfavor by those Canadians who desire to purchase coal from the United States, and by those United States coal operators whose coal is or could easily be marketed in Canada, as well as by certain citizens of the United States who have purchased iron-ore lands in Canada and desire to ship the product to be smelted on this side of the line.

On the 27th of December last an organization of United States coal, iron and railway operators was effected in this city for the purpose of advocating the removal of these trade restrictions, under the name of the "Association for Reciprocity in Coal and Iron Ore." The officers elected were E. N. Frisbie, president; W. C. Andrews, treasurer; Charles J. Pusey, secretary. A committee consisting of E. N. Frisbie, James Tillinghast, John Moulton, H. C. Roberts, Samuel Thomas, W. C. Andrews and Charles J. Pusey was appointed to visit Ottawa and ascertain the disposition of the Canadian Government toward such a movement. This committee was at Ottawa recently in consultation with the Ministers of Finance and Customs, and was assured by them of the favorable action of the Canadian Cabinet. On the 24th of the present month a meeting of the producers of bituminous coal in Northwestern Pennsylvania was held in this city. The market of these operators is mainly at such points as Rochester, Buffalo and Erie, Hon. Galusha A. Grow, of Pennsylvania, presided. As their mines are now producing more coal than can be absorbed in the ordinary course of trade, the meeting, which was very largely attended, considered several plans of relief. They not only agreed upon a restriction of production, but also unanimously adopted the following resolution:

Resolved, That we are in favor of reciprocity with Canada on coal and iron ore, and we heartily approve the efforts making by the "Association for Reciprocity in Coal and Iron Ore" to secure the necessary action by the Governments of the United States and Canada to obtain such a result.

There is said to be a strong organization of capitalists at Cleveland who are interested in Canadian ore deposits, and who were reported some time ago as in favor of having the duty on ore reduced, notwithstanding the fact that they also control mines in the Lake Superior region. The present movement in favor of Canadian reciprocity is said to have originated on this side of the border among some of the interests above referred to. Being assured of the favorable attitude of the Canadian Government, they are now doing all they can to secure the proper action by Congress. A bill is to be drafted covering the enactment desired, and a committee will visit Washington to endeavor to pass it through both Houses. Such a measure will naturally incur the hostility of the coal operators of Central Pennsylvania, Maryland, Virginia and West Virginia. The fight over the bituminous-coal duty last winter showed that the coal trade had the power to retain the old duty on bituminous coal, in spite of the general reductions then made in the tariff. Nova Scotia coal was the competitor which it was desired to handicap, and it seems doubtful if special legislation will be permitted to accomplish that which the general tariff was directly intended to oppose. But it may be possible to pass a bill through the present Congress, which radically differs in sentiment, politics and sympathies from the last Congress, notwithstanding the opposition of the coal trade.

While the abolition of the duty on Canadian iron ore will hardly be acceptable to Lake Superior iron-ore producers generally, it would strongly displease Eastern manufacturing interests, which have for years been importing Spanish and other Transatlantic ores, and will shortly be importing Cuban ores. They would hardly feel like consenting to the endowment of the West with still greater advantages over them. Cheaper Western ores would undoubtedly mean fiercer competition for domestic trade. In that event, we take it, the Eastern manufacturers would favor the entire abolition of the iron-ore duty. It really appears to us that an appeal to Congress, as it is now constituted, for greater freedom of international trade, will receive more ample consideration and larger appreciation than petitioners for legislative favors are apt to have granted them.

One of the most important additions to the literature of sheet metals which has appeared in our columns in a long time is the classification of tin plates which we present in another portion of this issue. Numerous lists of brands have been published from time to time, and great stress has been laid by importers and dealers upon the importance of buying plates by brand, and thus appreciating the value of this advice, has

often attempted to act upon it, but has invariably been met with a difficulty at the outset which has been well-nigh insuperable. He has found, on investigating the subject, that no authoritative list of brands, with an indication of grade and quality, was to be found. Hence, in ordering by brand, although he might receive what he ordered, he still might fail to get what he wanted. Even those houses which have been most conspicuous in trading upon makers' brands have apparently been reluctant to make public a schedule of grades. The difficulties of correct classification of tin-plate brands are very great, and it is not at all strange that importing houses should hesitate before venturing upon such an undertaking. The unreliability of many manufacturers of tin plate, particularly some of the Welsh firms, is generally recognized. We mean unreliability in the sense of frequent deviations from standard in point of quality of goods produced. Great as these difficulties are, however, they have not deterred a firm of enterprising metal brokers in this city from issuing a classification such as the trade has long wished to possess. As we have explained elsewhere, this list is not official in the sense of being guaranteed by the makers of the plates named or by any importing house. It simply represents the judgment of the firm which publishes it. In it they have given to the trade their ideas of the relative grade of the various brands of plates named, which, considering the circumstances of their position, is likely to be very correct. We suggest to our readers that it is worthy of more than ordinary attention.

Production of Pig Iron and Bessemer Steel in the United States.

The Secretary of the American Iron and Steel Association has succeeded thus early in collecting the statistics of the production of pig iron and Bessemer steel for 1883. The total quantity of all kinds of pig iron manufactured in the United States last year was 4,595,510 gross tons. This was very slightly below the production of 1882, which was 4,623,323 gross tons. The production of 1881 was 4,144,254 gross tons. The year 1883 was therefore a long distance ahead of 1881, and but very little below 1882. The following table shows the quantity of pig iron made, according to the fuel used, in 1883, as compared with 1882:

	Gross tons.
Pig iron.	1882.
Anthracite.....	2,176,855
Charcoal.....	1,823,328
Total.....	4,000,183
	1,683,503
	625,130
	510,460
	4,595,510

The most remarkable fact about this exhibit is the increase in the production of bituminous pig iron, while there was a decided decrease in the production of the other kinds. More bituminous pig iron was made in 1883 than ever before in this country, and for the first time it exceeded the combined production of all other kinds.

Concerning the number of blast furnaces in the United States, Mr. Swank says that at the close of 1882 there were in the United States 687 completed blast furnaces, and at the same time there were 27 furnaces in course of erection. During 1883 there were 13 new furnaces completed—10 coke, 2 charcoal and 1 anthracite; and 17 furnaces were either burned or abandoned—12 charcoal, 4 anthracite and 1 bituminous. At the close of 1883 we had 683 completed furnaces in the country, and the information received shows that at that time there were in course of erection 10 furnaces—12 coke, 3 charcoal and 4 anthracite—some of which are included above in the furnaces under construction at the close of 1882.

The 15 Bessemer steel works in the United States produced 1,477,346 gross tons of ingots in 1883, which was a decrease of 37,342 tons on the production of 1882. Mr. Swank says: "This is a much smaller decrease than has been generally supposed. It was, however, the first decrease that has occurred in the history of the Bessemer steel industry of this country." The quantity of Bessemer steel rails produced in 1883 was 1,119,576 gross tons, against 1,191,383 tons in 1882. In reference to the total production of all kinds of steel rails, Mr. Swank says:

expect. A protectionist victory in New York and a free trade sentiment springing up in Pittsburgh are somewhat surprising. Taken altogether, however, these facts illustrate the feeling throughout the country to which the National Board of Trade alluded on the opening of their sessions in Washington on the 23d inst., when they reported, through their Executive Committee, that "with regard to the tariff the same difference of opinion has shown itself within the membership of the National Board of Trade which is to be found in the community at large."

Position of Scotch Pig Iron.

After a long period of depression and progressive shrinkage in prices, the New York market for Scotch pig iron has experienced a marked change. Prices are not only firm, but for some brands a decided advance has been established. The change was a sudden one, and was not generally anticipated, though for several weeks importers have been assuring their customers that prices were so low that a reaction might be expected at almost any time, and they advised them to buy then in the belief that prices could certainly go lower. But the market had been dragging along in a weak condition for so many months, and sellers appeared so anxious to book orders, that buyers generally held off, thinking they could do better in the future, or at least could get their supply of iron at the same price whenever it was actually needed. The market was also being demoralized from time to time by the arrival of iron which had to be sold for various reasons, and could sometimes be bought from ship or dock very much below regular quotations. But some customers were found who were willing to be persuaded to give their orders, and they have certainly benefited by their action, especially when they have bought such irons as have advanced most in price.

The outlook at the beginning of the year was undoubtedly gloomy to the general observer, and the tone of the Scotch home market reports was very discouraging. The average price of warrants in Glasgow, in 1883, had been the lowest of which we have any record—our statistics going back to 1863. The average was 46/9, which was 3d. under the average of 1879. The lowest price reached in the year was 42/10, which, however, was not so low as the lowest price recorded in 1878 and 1879, when warrants touched 42/3 and 40/ respectively. The depression continued for some time after 1884 opened, and warrants receded until, on January 8, 42/6 was touched. On the 9th and 10th an advance was established, which continued until, on the 18th and 19th, 44/6 was reached. Since then the warrant market has reacted, but the rate is still above 43/. Makers' prices have not advanced uniformly. Some have been marked up 4/, while in others there has been no change. The following table will show the prices of makers' brands on the 23d inst., as compared with the 2d inst., using for this purpose the quotations which are cabled to us directly from the other side:

	Jan. 2.	Jan. 23.
Coltness, alongside, Glasgow	58/	58/
Langloan,	54/	54/
Gartsherrie,	56/6	54/6
Summertown,	52/6	52/6
Carnbroe,	51/6	52/6
Glenarnock,	51/6	52/6
Ardrossan,	45/6	47/
Eglinton,	48/	49/6
Dalmellington,	50/	51/
Shotts, at Leith,	54/	54/

The improvement in prices is ascribed to various causes. One is the restriction of pig-iron production which has been adopted in the North of England. This will remove some of the pressure which is bearing severely on Scotch pig-iron makers, and has compelled them to reduce their prices to an unprofitable point. Another cause is the increased demand from several quarters, which the manufacturers hope will continue. The rise in price on this side of the Atlantic is not only caused by the advance in makers' quotations, but also by the stiffness in freights. Our freight quotations last week, as cabled from abroad, showed 4/6 to 5/ from Glasgow to New York, as against 4/ two weeks before. Private advices to importers here name even higher freight rates. The following table shows the changes made in New York quotations of Scotch pig iron from the 10th to the 24th inst.:

	Jan. 10.	Jan. 24.
Carnbroe	\$21.00 @ \$22.00	\$22.00 @ \$22.50
Coltness	22.25	22.50
Shotts	22.25	22.50
Glenarnock	21.00 @ 22.00	22.00 @ 22.50
Gartsherrie	22.50	21.00
Summertown	21.00	21.50
Carnbroe	21.00	21.50
Dalmellington	20.00	20.50
Eglinton	20.00	20.50

For deliveries at certain times higher rates are quoted in the case of several brands. We are cognizant of one transaction in which 9/ more was asked for a particular delivery than had been asked on the 8th inst.

The firmness in the price of Scotch pig iron has brought out many inquiries, and those who habitually use it for a mixture are a little uneasy about the future. Moderate sales have been made, but buyers hesitate to pay the enhanced prices. At the proffered rates of a few weeks ago they would now willingly lay in good stocks. There is much uncertainty about the strength of the rise, and, consequently, many buyers are taking their chances of a reaction. The price, however, may not react, but may go still higher. But in that case less Scotch pig iron will be used, unless in the meantime the price of American pig iron advances.

The Make of Pig Iron, and Our Quarterly Reports.

We have already called attention to the remarkably correct indication of the make of pig iron furnished by the returns of furnaces in and out of blast which we compile each quarter. These have been published continuously since 1876 and for part of that year. From these tables it has been possible to estimate the actual make of pig iron with an approach to exactness that is really marvelous. The approximations of each grade are not so exact as those of the total, but even these are not far wrong, on the whole.

To show how close to the real make our estimates are, we append two tables. The first one shows the capacity of the furnaces, as given in our quarterly report for each quarter of each year from 1877 to 1882, and an average per week ascertained by dividing the sum of the capacities reported for each quarter by four. In the second table the average capacity per week, as found in the first table, is multiplied by 52, and this taken as the estimated production, and in a parallel column is placed the actual production as given by Mr. Swank:

TABLE OF BLAST FURNACE CAPACITIES, FROM "IRON AGE" QUARTERLY REPORTS.

Date.	Capacity of char- coal furnaces in blast.	Capacity of an- thracite furnaces in blast.	Capacity of bitu- minous furnaces in blast.	Gross tons.				
				Articles.	Nov. 1883.	Dec. 1883.	1882.	1883.
1877.				Pig iron.	23,623	13,539	488,970	282,924
January.	6,382	10,460	21,660	Old iron.	429	4,017	55,583	46,025
April.	9,025	18,240	19,575	Steel, unwrought.	595	1,084	131,200	26,000
July.	7,730	17,442	20,030	Cast and wrought, &c.	196	311	6,774	5,008
October.	8,887	17,067	19,670	Tim plates.	17,509	10,904	214,598	212,734
Average per week.	6,743	17,923	20,466	Hoops and sheets, &c.	577	780	37,220	28,895
1878.				Bar, angle, &c.	364	410	22,445	8,788
January.	6,624	21,940	22,928	Iron and steel rails.	6,702	6,192	198,275	75,461
April.	5,001	19,410	23,644	Total.	50,195	37,287	1,195,116	688,187
July.	5,420	19,315	21,736					
October.	7,079	17,860	19,360					
Average per week.	6,081	19,356	21,915					
1879.								
January.	6,628	20,669	22,326					
April.	6,236	19,964	23,263					
July.	7,430	21,082	28,438					
October.	9,119	23,399	32,573					
Average per week.	7,854	22,763	27,480					
1880.								
January.	9,013	35,267	37,349					
April.	8,842	40,066	39,472					
July.	11,875	36,189	33,156					
October.	13,938	39,331	35,700					
Average per week.	10,929	35,350	36,440					
1881.								
January.	14,708	34,845	45,488					
April.	13,505	32,069	48,410					
July.	14,599	32,313	46,796					
October.	15,000	33,224	45,515					
Average per week.	14,454	34,117	47,009					
1882.								
January.	15,186	38,108	48,558					
April.	16,596	38,569	52,027					
July.	15,875	36,715	40,481					
October.	16,206	36,373	42,722					
Average per week.	15,273	37,563	46,300					
1883.								
January.	2,914,611	2,914,585						
Charcoal.	818,612	268,369						
Anthracite.	1,006,525	1,042,270						
Bituminous.	1,139,006	1,151,032						
Total.	2,910,743	2,577,861						
1878.								
Charcoal.	568,334	326,878						
Anthracite.	1,163,702	1,378,094						
Bituminous.	1,438,930	1,438,978						
Total.	2,905,066	3,070,875						
1879.								
Charcoal.	568,334	326,878						
Anthracite.	1,163,702	1,378,094						
Bituminous.	1,438,930	1,438,978						
Total.	2,905,066	3,070,875						
1880.								
Charcoal.	568,334	326,878						
Anthracite.	1,163,702	1,378,094						
Bituminous.	1,438,930	1,438,978						
Total.	4,301,453	4,296,414						
1881.								
Charcoal.	751,634	438,628						
Anthracite.	1,774,193	1,734,462						
Bituminous.	2,446,007	2,434,978						
Total.	4,971,821	4,641,564						
1882.								
Charcoal.	794,443	697,906						
Anthracite.	1,065,471	2,042,128						
Bituminous.	2,402,907	2,434,978						
Total.	5,150,821	5,178,123						

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Office of The Iron Age, 83 Reade St., New York.

Hardware Manufacturers and Capitalists.

The undersigned is prepared to enter into contract for furnishing Tack Machinery complete, to equal the best, or to sell the right to make them, I believe, the only person in the country who is able or willing to make such a proposition. Address WM. BOWDEN, Jr., Frederick, Md.

BUYERS OF HOES.

We have 1000 dozen Socket Riveted Hoes, made and making, which we wish to dispose of cheap. They are equal in all respects to any make.

Address LESTER & LYMAN MFG. CO.,
Millers Falls, Mass.**Traveling Salesman.**

Wanted, a Travelling Salesman acquainted with the Hardware and Machinery Trades.

State age, experience and salary expected.

Address "TRAVELING SALESMAN,"

Box 11,

Office of The Iron Age, 83 Reade St., New York.

Special Notices.

Bargains in New and Second-hand Machinery.

One Corliss Beam Condensing Engine, 30 in. x 72 in. New.

One Horizontal Corliss Engine, 14 in. x 30 in. New.

One Horizontal Corliss Engine, 10 in. x 22 in. New.

One Horizontal Engine, 12 in. x 24 in. New.

One Horizontal Engine, 11 in. x 24 in.

One Horizontal Engine, 11 in. x 16 in. New.

One Horizontal Engine, 12 in. x 18 in.

One Horizontal Engine, 8 in. x 14 in. Ames.

One to H. P. N. Y. Safety Co.'s Up. Engine and Boiler.

One 4 H. P. Oscillating Engine and Boiler.

One Horizontal Engine, 5 in. x 12 in.

One Locomotive Boiler, 5 in. x 12 ft.

One Locomotive Boiler, 3 ft. x 12 ft.

One Hor. Tub. Boiler, 6 ft. x 24 ft.

One Hor. Tub. Boiler, 45 in. x 13 1/2 ft. New.

One Hor. Tub. Boiler, 48 ft. x 14 ft.

One Upright Boiler, 30 in. x 8 ft. high.

One Upright Boiler, 30 in. x 8 ft. high.

One Engine Lathe, 22 in. x 12 ft. New.

One Engine Lathe, 18 in. x 8 ft. New.

One Engine Lathe, 17 in. x 6 ft.

One Engine Lathe, 14 in. x 4 ft.

One Engine Lathe, 13 in. x 5 ft.

One Engine Lathe, 14 in. x 6 ft.

One Engine Lathe, 14 in. x 5 ft. 6 in. bed.

Two Horizontal Lathes, 10 in. x 6 ft.

One Horizontal Lathe, 10 in. x 6 ft. 6 in.

One Horizontal Lathe, 10 in. x 6 ft. 6 in.

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Special Notices.

LIST
OF
NEW AND SECOND-HAND
IRON
AND
Wood Working Machinery
ENGINES, BOILERS, &c.,
ALL IN GOOD RUNNING ORDER.

FOR SALE BY

HENRY I. SNELL,
No. 135 NORTH THIRD STREET,
PHILADELPHIA.

February, 1884.

ENGINES AND BOILERS.

One 20-inch cylinder, 42-inch stroke Corliss Engine, built by Wetherby & Co.; has all modern improvements, valve motion with crab claws and dash pots, band fly-wheel, 12 feet diameter, 24-inch face, made in halves. Engine in excellent condition.

One 16-inch cylinder, 36-inch stroke Corliss Engine, built by Wetherby & Co.; band wheel, 12 feet diameter, 20-inch face; latest design of valve motion, in first-rate condition; used 5 years.

One 12-inch cylinder, 42-inch stroke Corliss Engine, made by Geo. H. Corliss; has been put in thorough order; wheel will be made new to suit purchaser.

One 16-inch cylinder, 20-inch stroke Vertical Engine, made by Fricke & Co.; nearly new and in perfect order; band wheel 8 feet diameter, 24-inch face; governor, oil cups, &c.

One 12-inch cylinder, 12-inch stroke Vertical Engine, built by New York Safety Steam Power Co.; Pickering governor; wheel, 24-inch diameter, 4-inch face; in first-rate order.

One pair of Vertical Engines, built by Pittsburgh Machine Co.; cylinders, 7 x 7, mounted on one frame; crank at right angles with shaft, and one 42 x 25 turned fly-wheel; and 30 x 8 pulley; Judson governor, oil cups, &c.

Two 12-inch cylinder, 7-inch stroke New York Safety Steam Power Co. Vertical Engines; used only a few hours, guaranteed good as new; wheel, 32 inches diameter, 4 1/2-inch face.

One 12-inch cylinder, 16-inch stroke Horizontal Engine, plain valve with box bed plate; 3-inch governor; wheel to suit purchaser; built by Hutchinson & Alexander, and entirely new.

One 12-inch cylinder, 15-inch stroke new Horizontal Engine, with pump and heater; built by the Supple Steam Engine Co.; has 3-inch Gardner governor and 7-foot wheel.

One 10-inch cylinder, 14-inch stroke Horizontal Engine, new; built by the Diamond Drill Co.; has 3-inch Waters governor; wheel, 24-inch diameter, 4-inch face; used 5 years; good order.

One 7 1/2-inch cylinder, 12-inch stroke Portable Engine, with locomotive boiler, mounted on wheels, with pole, and all running gears complete; Judson governor, pump and heater; fly-wheel; used 6 months.

One 6 H. P. Marine Boiler; waist, 66 inches diameter, length over all, 12 feet; fire-box, 56 inches long; lower rows of flues contain two 14-inch, one 10-inch, one 6-inch flue, all 6 feet long; upper row, 31 3/4-inch tubes, 8 ft. long; complete with grates and fittings; all in good order.

One 6 H. P. Horizontal Tubular Boiler, 42-inch diameter, 9 feet long, with 40 3-inch tubes; smoke-box extension, front and fittings complete; vertical dome, 24 x 24; good order; built by Erie City Iron Works.

One 10 H. P. Horizontal Tubular Boiler, built by Wibberley & Bros.; 48 inches diameter, 12 feet long; 39 1/2-inch tubes; full front and all fittings complete; vertical dome, 24 x 24.

One 3 1/2 H. P. Horizontal Tubular Boiler, 48 inches diameter, 10 feet long, with 40 3-inch tubes; full front and fittings complete.

One 6 H. P. Tubular Boiler, new, 54 inches diameter, 14 feet long, with 40 4-inch tubes; shell, 1/8 inch best flange iron; 50,000 pounds tensile strength; double riveted; heads, 2 1/2 inch; vertical dome, 36 x 36; built in most thorough manner; complete with fittings and full fire front.

Four 60 H. P. Return Drop Flue Boilers, each 6 feet diameter, 24 feet long, with internal fire-box and four flues; 12 inches diameter, 15 feet long; and two flues; 18 inches diameter, 14 feet long; shell of 11 1/2 inch best flange iron, and built in the most thorough manner; used only 18 months.

IRON TOOLS.

One iron planer 32 inches wide; planes 7 feet long; has cross-down and angle feed, and driven with two belts; built by Robt. Bishop.

One 16-inch Prentice drill, with lever attachment to spindle; table raises and lowers by lever; nearly new.

One crank planer, by New York Steam Engine Co.; 12 inch stroke, with quick return motion; table, 20 inches long, 15 1/2 inches wide; countershaft and pulleys complete.

One 15-inch Engine Lathe, 12-foot bed, very heavy, well-built tool; has rod and screw feed, full set of change gears, power and cross-bar, steady and following rests, two face plates, overhead pulleys and countershaft complete; new.

One 15-inch Engine Lathe, 8-foot bed, with screw and rod feed; full set of change gears, steady rest, face plate and overhead pulleys complete; built by New Haven Manufacturing Co.

One 20-inch New Haven Lathe, 12-foot bed, with rod and screw feed, full set of change gears, compound rest, power cross feed, Bean's patent countershaft, center and following rests, large and small face plates, extra tool block to turn whole swing of lathe, wrenches, &c.

One 15-inch new lathe, 8-foot bed, built by New Haven Manufacturing Co.; complete with rod and screw feed, full set of change gears, rise and fall rest, power cross feed, large and small face plates, center rest, wrenches, and Bean's patent noiseless friction countershaft.

One 20-inch Smith & Garvin Hand Milling Machine, with adjustable vise, countershaft and pulleys complete.

One 3 Spindle Drill, built by Smith & Garvin; table raises and lowers by a lever.

One Pratt & Whitney Shaping Machine, 8-inch stroke, with quick return motion, countershaft and hangers.

One 20-inch Putnam Machine Co.'s Lathe, 14-foot

Special Notices.

bed, with full set of change gears, countershaft and pulleys.

One Peck's Drop Press, with patent lifter complete; hammer weighs 217 pounds.

A large stock of the Scientific Forge Co.'s Portable Forges, with improved friction clutch; best forge in use.

One Hydraulic Press, 10-inch ram; platen, 42 x 30; rods, 3 1/2 inches in diameter; 8 feet between platens; 40-inch raise to ram one pump; 1/2-inch plunger, with cistern tank.

WOOD-WORKING MACHINERY.

One heavy 8-inch, 4-sided Molding Machine, with brass slotted heads, countershaft and all attachments complete; built by J. A. Fay & Co.

One 6-inch, 3-sided H. B. Smith Molding Machine, complete with countershaft and pulleys.

One 36-inch heavy iron frame Band Saw, built by Colladay & Bro.; has tilting table and all late improvements.

One Band Saw, setting and filing machine, built by Atlantic Works.

One No. 1 Universal iron-frame Saw Bench, made by H. B. Smith, with adjustable table.

One Cross Cut Saw Bench, iron frame, with sliding table and boring attachment.

One iron-frame Boring Machine, Walker's patent; table has foot lever to raise and lower.

One Gray & Wood's planer, with extra feed rolls; planes 10 feet long, 24 inches wide, with counter-shaft and pulleys complete.

One 30-inch Wood Lathe, on iron shears, 7 feet long, with T rest centers, chuck, face plate and countershaft complete.

One 30-inch Smith's iron-frame surfer, double belt, countershaft and pulleys, modern build.

One Green's improved Panel Raiser, built by Millspaugh & Rowley; complete with counter-shaft and pulleys.

One Wright's patent Scroll Saw, with attachments complete.

One Railway Cut-off Saw, with table and counter-shafting and belt tightener; Wright's patent.

One 24-inch Planer and Matcher, built by R. Ball & Co.; surfaces, 24 inches; tongues and grooves, 12 inches; first-rate order; countershaft and pulleys complete.

One 24-inch Heavy Planer and Matcher, built by Witherby, Rugg & Richardson; planes, 24 inches wide; tongues and grooves, 12 inches wide; complete with countershaft, &c.

One 24-inch extra heavy six-roll Planer and Matcher, built by Witherby, Rugg & Richardson; planes on both sides 24 inches wide, and tongues and grooves 12 inches; has all attachments complete.

One 24-inch extra heavy six-roll Planer and Matcher, built by Witherby, Rugg & Richardson; planes, 24 inches wide, and tongues and grooves, 12 inches wide; complete with countershaft, &c.

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One 24-inch extra heavy six-roll Planer and Matcher, built by Witherby,

to parties who are not familiar with the two grades, or who use such quotations as a lever in buying the first quality. A good many Screws have been sold and a fair trade is now doing. The circular and quotations of the American Screw Company, which we give below, have had some effect in stiffening prices and inducing a better feeling.

SCREWS.

The American Screw Company have issued a circular, dated January 22, showing the following discounts on the whole line of their goods as given in their new catalogue:

Patent Gimlet-Pointed Wood Screws.

	Dis. per cent.
Iron, Bright, Flat Head	70
" " Special sizes	72 1/2
" " Round Head Piano	67 1/2
" " " 65	65
" Blue, Flat Head, (add 2 1/2 per cent. to net amount of invoice)	70
Iron, Blued, Round Head Piano	67 1/2
" " " 65	65
Felloe, Flat Head	65
" Pinched Head	65
" Japanese, Flat Head	55 1/2
" " Round Head	50 & 10
Tinned, Flat Head, (add 10 cents per pound)	60
" " Round Head	55
Lacquered, Flat Head, add 25 cts per gross	60
" " Round Head	55
Bronzed, Flat Head	60
" " Round Head	55
Brass Plated, Flat Head	60
" " Round Head	55
Copper Plated, Flat Head	60
" " Round Head	55
Silver Plated, Flat Head	60
" " Round Head	55
" " Flat Head (Burnished, add 80 cents per gross)	55
Iron, Silver Plated, Round Head (Burnished, add 80 cents per gross)	50
Iron, Brass Capped, Burnished	40
" " Silver	40
" Nickel Plated, Flat Head, Burnished	50 & 10
" " Round Head	50
Iron, Continental, Flat Head	50
Brass, Flat Head	70
" " Round Head	60
Silver Plated, Flat Head (Burnished, add 80 cents per gross)	55
Brass, Silver Plated, Round Head (Burnished, add 80 cents per gross)	50
Brass, Nickel Plated, Flat Head (Burnished, add 80 cents per gross)	60
Brass, Nickel Plated, Round Head (Burnished, add 80 cents per gross)	55
Brass, Lacquered, Flat Head (add 35c per gross)	55
" " Round Head	50
" " Bronzed, Flat Head	55
" " Round Head	50
Copper, Flat Head	50
" " Round Head	50
Bronze, Flat Head	60
" " Round Head	50
Phosphor-Bronze, Flat Head	40
" " Round Head	30
Machine Screws, Bolts, Rivets and Miscellaneous Goods.	Dis. per cent.
Machine Screws.	
Iron, Flat Head	55
" " Round Head	50
" " Fillister Head	45
Brass, Flat Head	55
" " Round Head	50
" " Fillister Head	45
Taps, for Machine Screws	40
Tire Bolts, No. 10, Philadelphia	70
" Bay State	65
Sleigh Shoe Bolts	75
Stove Bolts, Flat Head	60
" " Round Head	57 1/2
Sink Bolts	57 1/2
Pointed Wires	65
Rivets.	
Tapped Nuts	30
Ordinary, in bulk	45
Cooper	45
Threaded	45
Thousands, in papers	45
Block and Carrage, in papers	45
Hame	45
Belt, with Burrs	45
Burrs, for Rivets	45
Coach Screws	75
Hand Rail Screws	70
Dowel Screws	65
Wire Goods	70 & 10
Wire Nails, Iron	30
" " Iron Escutcheon	30
" " Brass Escutcheon	35

The special sizes of Flat Head Bright Screws to which they refer in the second line as subject to a discount of 72 1/2 per cent. are the following, which they offer to the extent of the production of their New England Mill at this figure: 1 in., Nos. 8, 9, 10, 11; 1 1/4 in., Nos. 9, 10, 11, 12; 1 1/2 in., Nos. 10, 11, 12, 13; 2 in., Nos. 12, 13, 14, 15. The production of Continental Screws being limited, the manufacturers announce that they will supply them only to parties ordering first quality, and in quantities to suit their own convenience. Freight is allowed to principal cities on or east of the Mississippi River.

Referring to the fact that they are now manufacturing Screws of Phosphor-Bronze Metal, they remind the trade that this metal has a rich bronze color, matching the best qualities of Bronze Hardware; that it is non-corrosive to a greater degree than pure copper, and being harder than brass, without tendency to crystallization, that it has much greater tensile and torsional strength. For these advantages they recommend their Screws made of this material as the strongest non-rusting Screws obtainable, for use in the fitting of steamships, railway and street cars, mines, and machinery subject to vibration.

P. & F. Corbin, New Britain, Conn., and 87 Chambers street, New York, have issued a circular giving their position as manufacturers of Screws, from which we make the following extracts:

There seems to be a question whether the manufacture of Wood Screws has become established by inheritance, prescription or otherwise as a divine right. Pending its solution, disturbing elements are to be expected in the market. We neither claim for ourselves, nor admit the title of others to, the right described, but we have the American tendency to remain in the field while the disturbance continues. " Providence permitting," and with the continued favor of our customers, we will proceed as usual with the manufacture of Wood Screws. We propose to issue circulars on the first of each month, making prices at that time upon purchases made during the month next preceding. We feel sure that our customers will approve this course, as we shall not depart from the principle of square dealing we have always endeavored to maintain in our business. We have taken this position in order to meet the various prices which are bound to be put in circulation, and we feel that our mutual interests will thereby be

promoted, assuring our friends that our prices will be in keeping with the current ruling rates. We refer in this circular only to first-quality Screws, and not to seconds, which will appear in the market under various names, at reduced prices.

THE SYNDICATE DISCUSSION AGAIN.

We have received the following communication, which is sent as a brief in the case of

MANUFACTURER, JOBBER & CO.,

vs.
SYNDICATE.

It purports to be a plea "in behalf of Jonathan, the original plaintiff in interest:"

To the Editor of *The Iron Age*: Mr. Dudley's little request for information has stirred up quite a lively correspondence in your columns, mainly on the part of manufacturers anxious to be considered by the jobbers as devoted to their interests, and jobbers who would have manufacturers believe they lie awake nights to plan for the good of all square-toed manufacturers, but in their haste to advertise their loyalty each to the other, they seem to have forgotten all about Mr. Dudley, and neglect entirely to answer his inquiry as to how to introduce and sell his goods.

With the clashing interests of manufacturer, jobber and syndicate I shall have nothing to do. I stand on the broad neutral ground of the loving wife at the bear fight, and cry with her, "Wade in, bear sail in, husband!" I am here to give Mr. Dudley the only disinterested advice he seems likely to get for the selling of his goods and the conduct of his business, which is briefly this: Sell your goods for all you can, to whomever you can. Be your own judge as to what a customer is worth to you, and make your prices accordingly, resting assured that, protect the jobber as you may, he will cut the life out of the combination price mad for his special benefit, and give away your confidential rebate the first chance he gets to make the price of your goods a starter or a blind for working off goods that pay better profit, and will drop you (Mr. D.) like a hot potato the moment another manufacturer's goods or discounts strike him more favorably. I appeal to any candid manufacturer if this is not a fair statement of the case, and to every honest jobber if these are not bottom facts.

X-ROADS DEALER.

INEQUALITIES IN THE LOCK LIST.

We are in receipt of a letter from a Hardware house in this State, with reference to the inequalities of the Lock lists, the substance of which we take pleasure in laying before our readers. It gives the experience of a long-established and intelligent house regarding a point, which other merchants will take interest in comparing with their own. There has been, our correspondents say, a great deal of complaint among retail Hardware dealers in their section with reference to the Lock list. They cite the instance of a 12-change Mortise Lock, 3 1/2 inches, iron bolt, face and strike plate, which at the published price under the old list sold at \$2.50, while the same Lock, identical in every respect, except that it is made with brass bolts, face and strike, netted at \$5.75 per dozen. They therefore call attention to the great difference in price between Iron Bolts and Stops and Brass Bolts and Stops, and the fact that medium and good Locks are too high. They write us that they know of no retailers who are in sympathy with the list, as it places them at a disadvantage when they are called to furnish good trimmings for a house, it being "too much money in the hands of the Lock makers and too little in theirs." As giving illustrations of the feature in the Lock list of which they complain, our correspondents send the following net prices for some of the different kinds of Locks to which they refer, at 60 per cent. discount from the new list:

Closet Locks.

3 1/2 x 2 1/2, Com. Rim Del. Iron Bolt and Key

\$1.16

3 1/2 x 2 1/2, Com. Rim Del. Iron Bolt and Key

9.10

3 1/2 x 2 1/2, Com. Rim Del. Brass Bolt and Key

8.60

Rim Latches.

3 1/2 x 2 1/2, 1 Iron Bolt

1.16

3 1/2 x 2 1/2, " and Slide Bolt

1.40

4 x 2 1/2, 1 Iron Bolt

1.70

4 x 2 1/2, " and Slide Bolt

2.20

4 x 2 1/2, 1 Brass Bolt

2.30

4 x 2 1/2, " and Slide Bolt

2.30

Common Rev. Rim Locks, 1 Tumbler—Upright.

4 x 3 1/2, Iron Bolt and Key, no Stop

1.88

4 x 3 1/2, Brass Bolt and Key, no Stop

3.00

4 x 3 1/2, Iron Bolt and Key, with Stop

.94

4 x 3 1/2, Brass Bolt and Key, with Stop

4.02

4 x 3 1/2, Iron Bolt and Key, with Thum Bolt

2.52

4 x 3 1/2, Brass Bolt and Key, with Thum Bolt

5.30

12-Change Rev. Rim Locks, 1 Tumbler—Upright.

4 x 3 1/2, Iron Bolt and Key, no Stop

2.18

4 x 3 1/2, Brass Bolt and Key, no Stop

4.26

4 x 3 1/2, Iron Bolt and Key, with Stop

.96

4 x 3 1/2, Brass Bolt and Key, with Stop

2.34

4 x 3 1/2, Brass Bolt and Key, with Thum Bolt

2.88

4 x 3 1/2, Brass Bolt and Key, with Thum Bolt

5.66

Common Rev. Mortise Locks, 1 Tumbler.

3 1/2 x 3 1/4, Iron Front, Strike-Bolts and Keys

1.92

3 1/2 x 3 1/4, Brass Front, Strike-Bolts and Keys

4.06

4 x 3 1/4, Iron Front, Strike-Bolts and Keys

2.80

4 x 3 1/4, Brass Front, Strike-Bolts and Keys

5.60

12-Change Mortise Locks, 1 Tumbler.

3 1/2 x 3 1/4, Iron Front, Strike-Bolts and Keys

2.22

3 1/2 x 3 1/4, Brass Front, Strike-Bolts and Keys

4.36

4 x 3 1/4, Iron Front, Strike-Bolts and Keys

5.90

4 x 3 1/4, Brass Front, Strike-Bolts and Keys

7.70

Mortise Locks.

1 1/2 x 3 1/4, Iron Front and Bolts

1.40

1 1/2 x 3 1/4, Brass Front and Bolts

3.00

We may add, as a partial explanation of the inequality to which exception is taken, that in many cases manufacturers of standard Hardware articles are induced by competition to make cheap goods at little or no profit, taking care to have broader margins on the better grades.

THE STANLEY RULE AND LEVEL COMPANY are about to issue a new illustrated catalogue, under date of January 1, 1884, of which they say, by way of introduction:

We invite attention to the within catalogue and price list of improved Carpenters'

Tools manufactured by us. Buyers will notice the omission of Stearns's Boxwood Rules from this catalogue. The improvement of our regular line of Boxwood Rules up to its present high standard has rendered the carrying of the two lines by us quite unnecessary. We retain the full line of Stearns's Ivory Rules, so long known and favorably regarded by dealers in fine tools. These goods are mostly distinctive in style and finish from any other similar line. The prices of Stearns's Ivory Rules have now been

changed to admit of a uniform discount with the line of Stanley's Ivory Rules.

Resolved, That this minute be placed upon our records, and that a copy be sent to his family, with the assurance of the sincere condolence of the members of this board in their affliction.

[Signed.]

tons, for instance, shows that the loss of trade is largely in foreign Iron, the percentage of loss in domestic consumption being less than $2\frac{1}{2}\%$. Another feature is that, while the increase in stocks during the last two months of the year amounts to 50,000 tons, business since the first of January is believed to have absorbed at least that quantity in addition to current production. Another strong point is that there are so few furnaces in blast that the danger of over-production has been entirely removed, so that under ordinary conditions prices are undoubtedly on a solid-rock foundation. There is another important point for consideration, however, and that is consumption. It is tolerably clear that the supply has been adjusted to a comparatively moderate demand, and while it is hoped that consumption can be maintained (and as a matter of fact there is no special reason for thinking otherwise), there are points of uncertainty which cannot be ignored. The Finished-Iron trade, for instance, is in a very unsatisfactory condition, both as to price and demand, and without some improvement in this direction the Pig-Iron market is not likely to be very buoyant. Pipe founders are very busy, and the impetus given to the market from this source has been of inestimable value. The general foundry business is slack, and, in fact, a large proportion of consumers are working from hand to mouth, hoping for better things toward spring, but have nothing very definite to base their expectations upon. This uncertainty is felt in every branch of business, and in endeavoring to define the character and prospects of the Pig-Iron trade it would be unfair to omit reference to it.

Sales during the week have been at prices within the range last quoted. Business has been satisfactory in amount, and on small lots prices are possibly a shade higher, the entire market being steady, with a tendency toward increasing firmness. No. 1 Foundry has sold at \$20 @ \$21.50, delivered at tide; No. 2 @ \$19 @ \$19.50, and Mill Irons at \$17 @ \$17.50 at furnace for ordinary brands, up to \$19 for a few special brands. Good brands of Southern Iron are still available to a limited extent at about \$18 delivered, but some are inclined to ask a trifle more money.

Foreign Iron.—Bessemer Pig has been inquired for, and bids of \$19.50 made for 5000-ton lots, for shipment to New York. Sellers have been quoting \$20 as an inside rate, but are endeavoring to meet buyers about half way, and it is not unlikely that business will be done on this basis. There are buyers of Spiegelisen at about \$28 for 20%, but sellers appear unwilling to quote in the present condition of the market, although about \$29 is named for limited quantities.

Muck Bars.—Demand very light, but prices are steady at from \$32 to \$32.50 at mill, according to location, quantity and quality.

Blooms.—Dull and unchanged at about the figures recently quoted, viz.: Charcoal Blooms, \$55 @ \$57; Run-out Anthracite, \$45 @ \$47.50; Scrap Blooms, \$42 @ \$43; Northern Ore Blooms, \$39.50 @ \$41.50.

Bar Iron.—The demand shows no improvement, and business still remains in very unsatisfactory condition. One way or another there is a good deal doing, but the lots are small and give no assurance of employment beyond that of a day-to-day character. There seems to be no inquiry whatever for large lots, although many leading consumers are still running their establishments pretty well up to their full capacity. Others are doing very little, however, and as there is great unwillingness to carry stocks, the demand is naturally of a spasmodic and unsatisfactory character. Prices remain at 2% for the majority of business, but there are some willing to sell at 1.95%, and even 1.9%, when the order is of good size and of a desirable class.

Plate and Tank Iron.—Prices are still low and unsatisfactory, but the mills have taken in a considerable amount of work within the past two weeks, and it is thought that the market is on the eve of an improvement. Two or three orders have been placed, amounting in the aggregate to about 1500 tons, while the demand for small lots has been quite active. On the whole, therefore, manufacturers consider themselves in a better position than they have been for some time, although they may have some difficulty in restoring quotations, concessions having been granted in nearly all transactions since the beginning of the year. Quotations are about as follows: Boat Plate, 2.25%; Tank Iron, 2.3% @ 2.35%; Shell, 2.75% @ 2.85%; Flange, 3.75% @ 3.85%; Fire-Box, about 4.75%.

Structural Iron.—Business is quiet, and there is no change to report either as to price or demand. A few small orders have been taken during the week, but nothing to call for special notice. New business is mentioned as probable in the near future, but there is nothing definite at present. Prices are as last quoted, viz.: Angle quoted 2.2% @ 2.25%; Bridge Plates, 2.25% @ 2.3%; T's, 2.75%; Beams and Channels, 3.5%.

Sheet Iron.—There is an improved feeling, under a somewhat better demand, and manufacturers are beginning to feel hopeful as to the spring trade. A few good-sized orders have been closed on special rates, but for small lots quotations are as before, namely:

Best Refined, No. 28.....	44%
Best Refined, Nos. 26 and 27.....	54%
Best Refined, Nos. 21 to 25.....	54%
Best Refined, Nos. 18 to 20.....	54%
Common, 1/4 less than the above.....	64%
Best Bloom Sheets, Nos. 23 to 25.....	64%
Best Bloom Sheets, Nos. 16 to 21.....	54%
Common Bloom Plates, 3-16 to 16.....	2.75%
Blue Annealed.....	2.75%
Best Bloom, Galvanized, discount.....	50%
Second quality, discount.....	55%
Common.....	60%

Wrought Iron Pipe.—The usual January dullness in the Pipe trade seems to be intensified this year. There is scarcely any demand at all, and the inquiries which followed the issue of the new list have ceased also. Manufacturers are making up stock for the coming season, and take the present quietness as a matter of course. Prices are firm, with discounts about as reported last week, viz.: Butt-Welded Black Pipe, 25% @

30% discount; Butt-Welded Galvanized, 15% @ 20%; Lap-Welded, 45% @ 50%; Galvanized, 25% @ 30%; Boiler Tubes, 47%.

Steel Rails.—There is no special change to note, the market being quiet and steady about last week's quotations. The mills are now all comfortably well supplied with orders, and, while there are a good many vacant spaces to be filled in, there is reason to expect that the current demand will be sufficient to tide them over. Inquiries continue somewhat numerous, but the amount of orders given out is not important, being chiefly in lots from 100 to 200 or 300 tons each. Prices are steady at \$35 at mill, with moderate concessions to buyers of large lots when deliveries are favorable to sellers.

Old Rails.—The market is very irregular, but holders are asking higher prices. Small lots are held at prices varying from \$23 to \$23.50, with buyers at about \$22.75. Sales in lots of 50 to 100 tons each at full quotations.

Scrap Iron.—There is not much demand, but with light offerings prices are firm, with sales at about \$24 for No. 1 Wrought and \$16.50 for Cast.

Nails.—The demand for Nails still continues fair, but manufacturers do not seem anxious to press sales at present prices. Stocks generally are small, and it is thought that any increase in consumption would develop a scarcity of Nails. Prices are a trifle irregular at about the same figures as quoted last, viz., \$2.55 @ \$2.65, according to size of order.

PITTSBURGH.

Office of *The Iron Age*, 77 Fourth Avenue, PITTSBURGH, PA., Jan. 22, 1884.

The most important feature to note in connection with the Iron situation is an increased movement in the raw article, which indicates that there has been either an improvement in the products or that improvement is expected.

In regard to railroad construction, the indications are favorable. Owing to the extreme cold weather and heavy snow, but little has been done since the early part of December, but as soon as the weather is at all favorable work will be started up. The indications are that there will be as much railroad building this year as last; hence the outlook for Rails and all kinds of railroad supplies is good.

Ores.—The Lake Ore trade continues in an exceedingly unsatisfactory condition, with but little prospect of any immediate improvement. For a number of years past it has been customary with furnaces, not only here, but in the Shenango and Mahoning valleys, to contract for large quantities of these Lake Ores in January for a six months' supply; now these furnaces are buying as their immediate necessities require, those out of blast buying none at all, so that the Ore companies are anything but happy.

Pig Iron.—There has been a material improvement in the volume of business the past week, and, while prices remain unchanged, a stronger and more cheerful sense has been developed on the part of furnace men, who are not only convinced that the market has touched hard pan, but are hopeful of an early advance. Stocks in the hands of consumers are unusually light for the season, and will soon have to be replenished. While the trade do not look for any material advance, they expect an increased demand, and are hopeful of being able to put up prices from 50¢ to \$1 per ton within the next few weeks. The improvement reported Eastward has not been without its effect here; it begins to look as if the worst was over and better times for furnace men were near at hand. Sales have been made within the week under review at \$18.50 @ \$19, 4 months, for All-Ore Forge; \$17.50 @ \$18, 4 months, for Neutral Mill (Lake Ore), and \$17, cash; \$17.25 @ \$17.50, 4 months, for Foundry Irons, continue dull; quotable at \$18.50 @ \$20, 4 months, according to quality and brand. Bessemer Iron, \$21 @ \$21.50, 4 months, in a small way; a round lot could probably be bought at \$20.50, 4 months. Sales of 200 tons of No. 1 Cold-Blast Charcoal at \$28.50, 4 months.

Muck Bar.—There have been no sales reported for several months; hence it is difficult to give quotations; offered recently at \$32, cash, and might be bought for less.

Manufactured Iron.—The improvement continues slow, but sure. It is very evident, in view of the increased sales of the raw article, that there is more doing in the products, as manufacturers are very conservative and are in no mood to take any chances. With a very few exceptions the mills are in operation, some few of them working pretty full, and the indications are that there will be at least an average spring trade. Prices are still quoted on a basis of 1.75% @ 1.85% for Bars, 60 days, 2% off for cash.

Nails—The general position of the nail market remains unchanged; trade continues quiet, but the outlook for a good spring trade never was better. Prices remain unchanged at \$2.40, 60 days, 2% off for cash, for carload lots, and 5% @ 10% per keg additional in a jobbing way. The six weeks' shut-down which commenced on the 29th of December will expire in a couple of weeks, about which time the spring trade usually opens up.

Wrought Iron Pipe.—The mills here are all in operation working up stock. The demand continues light, and it is not expected that orders will be very plenty before March. However, it will take some weeks for manufacturers to work up stock enough with which to supply the warehouses and agents, and by that time large jobbers and consumers will be on the market. No change in prices. Discount in Butt-Weld Black Pipe, 30%; on Galvanized, 20%; on Lap-Weld, 50% on Black and 35% on Galvanized.

Old Rails.—There is considerable inquiry, but buyers and sellers are unable to get together; hence, but few sales. Consumers quote at \$23, while brokers say that for near-by delivery there are very few sellers under \$23.50 @ \$24.

Steel Rails.—An effort was made here a couple of weeks ago to put the price up

to \$36.50, cash, at works, but it did not work, as they could be bought for less elsewhere; hence, we now quote at \$35 @ \$35.50. The Rail department of the Pittsburgh Bessemer Works will be started up shortly.

Railway Track Supplies.—The demand continues light, but an improvement is expected within the next few weeks. Railway Spikes, 2 1/2¢, 30 days; Splice Bars, 1.75¢ @ 1.8¢; Track Bolts, 2 1/4¢ @ 3¢.

Steel.—The Merchant Steel trade continues light, but manufacturers are hopeful of an early change for the better. Prices unchanged; best brands of Refined Cast Steel, 10¢ @ 11¢; do. Crucible Machinery, 5 1/2¢ @ 6¢; do. Open-Hearth and Bessemer do, 4 1/2¢.

Crop Ends.—We hear of a recent sale of American at \$23, which may be regarded as the ruling price.

Scrap.—Some dealers report an improvement in the demand, but all agree that prices remain unchanged. Wrought, \$26 @ \$27 per net ton for No. 1, and 50¢ @ \$1 per ton additional for Selected; Wrought Turnings, \$16 @ \$18; Old Car Axles, \$30 @ \$31; Cast Borings, \$13 @ \$14, gross; Old Car Wheels, \$18 @ \$18.50, gross. A dealer bought a lot from the Pittsburgh and Western Railway Company recently at \$17.

Coke.—Is still quoted at \$1 per ton at ovens for blast-furnace Coke. Efforts are still being made by the syndicate to buy out all the small operators, and it will probably be successful in the end.

Window Glass.—The strike still continues, and manufacturers are supplying their customers as best they can with Eastern and foreign glass.

CHICAGO.

Office of *The Iron Age*, 26 and 28 Clark St., Cor. Lake St., Chicago, Jan. 28, 1884.

Hardware.—There is no change in the Hardware trade for the past week. The movement of goods is perhaps a trifle less strong, though not felt in a general way. In Carriage and Wagon Materials, Railroad Supplies, Blacksmiths' and Carpenters' Tools the demand is improving slowly, but Cutlery, Stove Wares and Builders' Hardware have been called for in smaller quantities, and there is a noticeable falling off in orders. Upon the whole the market is in a fair condition, and the volume of business thus far is something larger than for the same time last year, but hardly up to the standard set by many of the jobbers several weeks ago.

Nails.—The demand for Nails has dwindled to the smallest kind of a retail trade. Carload lots are not wanted to any extent, and when asked for, the purchaser is advised by manufacturers to hold off, wishing rather to husband their stock—which is light—for the small trade, than to sell in large lots at prices less profitable. For such orders as are being taken for retail consumption \$2.55 @ \$2.60 seems to be the price—the first said to be bottom figures. The market has a firm appearance, but in the absence of demand it is questionable whether it can be so regarded.

American Pig Iron.—The past week seems to have been an off week in the Pig Iron market. The feeling that an advance in price was imminent, which prevailed several weeks ago, and which at the time made sellers less anxious, is losing much of its weight as time goes on and the advance is not made. Many of the consumers who then began inquiring for futures are yet in the market, and show less inclination to buy to-day than they did a fortnight ago. Waiting has been so profitable to the buyer that it requires more than an ordinary effort to bring him to feel that he cannot get better figures by continuing in the same course.

For small lots and present delivery prices are quoted as firm and accepted by the buyer without argument. On lots for delivery through the summer contracts cannot be placed at quotations for Charcoal or Coke Irons. Other brands are also firm, and no disposition to cut rates is shown. For carload lots we quote as follows, 4 months: Lake Superior Charcoal, Nos. 1, 2 and 3, at \$22.50 @ \$23; Nos. 4, 5 and 6 at \$23; Lake Superior Coke at \$21 @ \$22; Lake Superior and Ohio, mixed, at \$21; Ohio Standard Black Band, No. 1, \$22 @ \$22; Southern, No. 1, at \$20.50, and No. 2 at \$19.50; Silvery Soft at \$19.50 @ \$21; Anthracite, No. 1, at \$22, and No. 2 at \$21.

Scotch Pig.—While prices for Foreign Iron are firm, there is nothing in the character of the market to induce sales. The change in freight rates, noticed a week ago, had the effect of waking up consumers for a short period, but was not sufficiently alarming to cause them to place orders for anything more than actual consumption required. For Glengarnock \$28 is quoted, and the same for Summerlee, and no concessions.

Merchant Steel.—The Steel market remains about the same as last week. The demand, which has perceptibly improved during the month, is getting proportionately better as the season advances. The implement manufacturers are taking pretty fair lots, and the orders from tool makers are better than anticipated. The finer grades have the preference and for these prices are in good condition. On the poorer qualities prices are less profitable and the competition very strong. For the Best Refined grades of Steel we make the following quotations:

Best Refined Cast Tool Steel..... 10. @ 10 1/2¢
Crucible Cast Machinery Steel..... 10 1/2 @ 10 1/2¢
Bessemer Machinery Steel..... 10 1/2 @ 10 1/2¢
Hollow Spring Steel..... 10 1/2 @ 10 1/2¢
To-Cake Steel..... 10 1/2 @ 10 1/2¢
Sled-Shoe Steel, flat..... 10 1/2 @ 10 1/2¢
Sled-Shoe Steel, curved..... 10 1/2 @ 10 1/2¢
Bessemer Steel..... 10 1/2 @ 10 1/2¢
Can Flow Steel..... 10 1/2 @ 10 1/2¢
German Flow Steel..... 10 1/2 @ 10 1/2¢
Syndicate Steel..... 10 1/2 @ 10 1/2¢
Fire-Box and Boiler Steel..... 10 1/2 @ 10 1/2¢

Steel Rails.—There being no demand for Steel Rails the market price has become a question difficult to decide. Roads that are unsupplied are in no hurry to place contracts, for the reason that prices have advanced as far as they are likely to for summer delivery with all the mills now running, while there are idle mills that may start up later on which will be more willing to take contracts and at lower figures than it is possible to place them to-day. The

North Chicago Rolling Mill Company are asking from \$37 to \$40, and claim that they must have these prices to make Rails at a profit at their mill that is not now running, where they must be made if they accept further orders. We hear of \$35 having been offered on a lot of 10,000 tons, but at present writing has not been accepted. There are current rumors that Eastern mills are taking orders to deliver in Chicago at the latter figure, but careful inquiry has failed to verify the report.

Old Rails.—Old Rails are quoted at \$21 @ \$22, Chicago or Milwaukee delivery, with an improvement in the quantity offering and taken.

Bar Iron.—The Bar Iron trade is perhaps a trifle more quiet in a retail way than a week ago. In heavy orders the week has been fully as productive, and the same strength and vitality in this class of trade continues. Quality is the deciding point now rather than price. The experimenting with unknown brands and the shopping for advantageous figures so prevalent two months ago have both passed away for the time, and consumers are placing their orders for the Best Refined Irons where there is no risk. For this quality, \$2 @ \$2.10 is quoted and firmly supported, except when concessions are made for quantity and special sizes. There are Irons being sold as low as \$1.90, but reliable authorities assert that the difference in price is the difference in quality, and has no effect upon the price of the better grades of Bar Iron.

Norway Bars.—The demand for Norway Bars continues fair and prices steady at 4¢ rates. There is considerable competition in the sale of this Iron, and it is possible that there are sales made for less, but if so, there is great caution to keep it from the public.

Builders' Iron.—Nothing in the way of business has developed beyond a few inquiries for several large building projects which are yet in embryo. We continue nominally our former quotations: Tank, 2 1/2¢; Angles, 2.9¢; Beams, 3.6¢, and Channels, 3.6¢ @ 3.8¢.

Plate and Tank Iron.—The market for this class of Iron is very dull. Trade shows no signs of improvement. We quote Tank at \$2.50 @ \$2.75; Shell, \$3.25 @ \$3.50; Flange, \$4.25 @ \$4.50. Steel Boiler Plate is in better request.

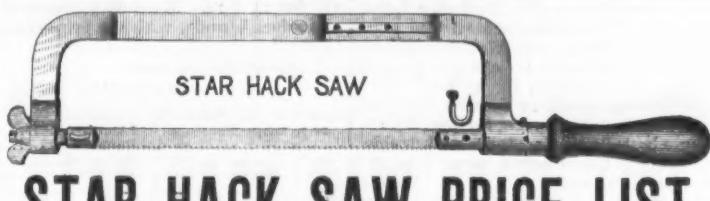
Galvanized Iron.—In a retail way the business in Galvanized is quiet. For special sizes there is a better demand, which helps to make up a tolerably fair trade for the season. Juniata is quoted at 50% off, and Red-fin at 50 and 10% off.

Black Sheets.—There is no improvement in the Black Sheet trade, so far as consumption goes. In the way of price there seems to be less cutting and more attention given to quality. We quote No. 24 at \$3.20, Nos. 25 and 26 at \$3.40, and No. 27 at \$3.60.

Scrap Iron.—There is nothing to report on Scrap Iron. Furnace price continues to be \$18.50 @ \$19.50, Chicago or Milwaukee delivery. The following are quoted as dealers' purchasing prices: No. 1 Wrought Scrap, \$16 per ton, \$16 @ \$17; Cast Scrap, \$17 per ton, \$17; Wrought Turnings, \$17 per ton, \$17; Cast-Iron Borings, \$6; Old Plow Steel, \$6; Tool Steel, \$7 per ton, \$20; Malleable Scrap, \$5.

Old Car Wheels.—The demand for Old Car Wheels is better than for any other old material at this time. We quote at \$17.50 per net ton for Broken, and \$22.50 per net ton for Whole Wheels.

EVERETT & POST.—The past week, Chicago, report to us as follows, under date of January 26, 1884



STAR HACK SAW PRICE LIST.

PRICE OF BLADES.

Length of Blade.....	6 inch.	7 inch.	8 inch.	9 inch.
Price per Dozen Blades.....	55	60	65	70 cents.

PRICE OF STEEL FRAMES PER DOZEN.

No. 1 Extension Frame, Polished and Nickel Plated, per Dozen.....	\$9.60
" 2 Solid".....	8.40

These frames are all made of steel, and, as seen in the cut, are all adjustable so as to face the blade in four different directions. The extension frames will hold the four different lengths of blades. The solid frames only hold the 8-inch blades, this being the length most in use; they all have the patent staple-shaped pins to hold the blades in the frame, which are so arranged that they cannot fall out. We say that the Star Hack Saw is 100 per cent. better than any other kind in use. If, on a fair trial, it is found that one dozen of our Saws will not cut as much as two dozen of any other kind, we hereby authorize all dealers to return what they may have in stock, at our expense. Now, if our competitors have the same faith in their saws, let them make the same offer, so that Dealers may unload what they don't want, and sell only the best, whichever one it proves to be.

MILLERS FALLS CO.,

74 Chambers Street, NEW YORK.



BONNEY VISE AND TOOL CO., Limited,

MANUFACTURERS OF
Bonney's Pat. Vises,
Machinists' Tools and Hardware Specialties.



OFFICE AND WORKS:
3015 CHESTNUT ST., PHILADELPHIA, PA.

As an evidence of the popularity of Bonney's Patent Vises, we have sold over 300,000 of them within the past four years, and the demand is still increasing.

MANUFACTURERS OF
GENUINE BRONZE, BRASS, AMERICAN BRONZED AND JAPANNED
HARDWARE,

Rim and Mortise Locks, Knobs and Escutcheons,
Apple Parers, Registers, Bronze and Cast Butts,
STATIONERS' HARDWARE, &c.,

READING HARDWARE CO., Reading, Pa.

VARIETY IRON WORKS.

ALFRED C. REX & CO.,
MANUFACTURERS OF
Hardware Specialties, Iron Toys, Novelties,
—AND—
HOUSE-FURNISHING HARDWARE.

Main Office and Factory, FRANKFORD, PHILADELPHIA.
Philadelphia Sample Office,
415 COMMERCE STREET. New York Branch Office,
128 CHAMBERS STREET.

BRAMBALL & SPIER, Managers.

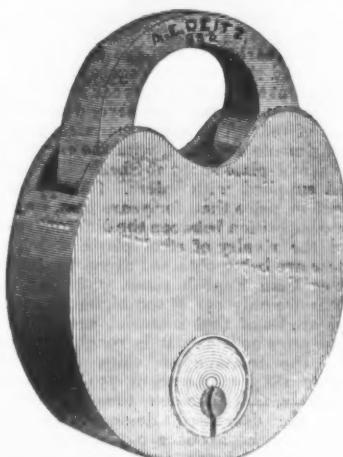
Spring Specialties—Lemon Squeezers, Steel Ice Tools, Steel Blade Hatchets and Axes, Egg Beaters and Cake Mixers. Send for Catalogue.

S. CHENEY & SON,
MANLIUS, N. Y.
MANUFACTURERS OF LIGHT AND MEDIUM WEIGHT
GRAY IRON CASTINGS
METAL PATTERN MAKERS AND JAPANNERS.

Correspondence solicited.

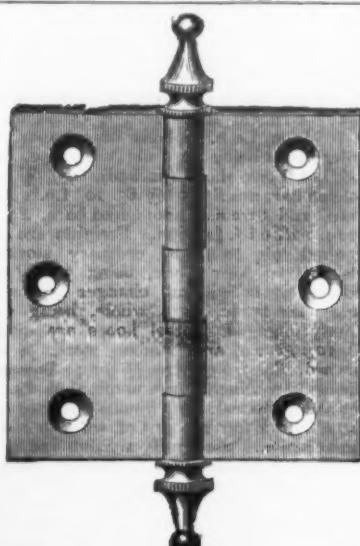
RIVETS
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cline in prices, and possibly promise some advance in the values of some kinds, if not in all. Quotations:
Best Hanging Rock Charcoal Foundry
Good
Southern
No. 2, \$1 less.
Hanging Rock Coke, Best
Good
Virginia, Alabama and Tennessee
No. 2, 60¢ @ \$1 less.
American Scotch, Best
No. 2, \$1 less.
Silver Gray Softeners, Best
Good
No. 2
Forge, no sales reported.
Car-Wheel, Cold-blast, Virginia, Maryland, Tennessee and Hanging Rock
Worm-blast, Alabama and Hanging Rock
Scrap Iron, no sales reported.

BALTIMORE.

W. N. WYETH, Iron and Steel Merchant, 46 and 48 South Charles street, reports us the following, under date of January 28, 1884: The improvement in trade noted in our last still continues, and as the reaction has now set in, it is but fair to suppose that better margins must soon be realized.

Ref. Bar Iron, 1 to 6 x 5/8 to 1, 1/2 to 2, 2 1/2 to 3 1/2 to 4 1/2 to 5 1/2 to 6 1/2 to 7 1/2 to 8 1/2 to 9 1/2 to 10 1/2 to 11 1/2 to 12 1/2 to 13 1/2 to 14 1/2 to 15 1/2 to 16 1/2 to 17 1/2 to 18 1/2 to 19 1/2 to 20 1/2 to 21 1/2 to 22 1/2 to 23 1/2 to 24 1/2 to 25 1/2 to 26 1/2 to 27 1/2 to 28 1/2 to 29 1/2 to 30 1/2 to 31 1/2 to 32 1/2 to 33 1/2 to 34 1/2 to 35 1/2 to 36 1/2 to 37 1/2 to 38 1/2 to 39 1/2 to 40 1/2 to 41 1/2 to 42 1/2 to 43 1/2 to 44 1/2 to 45 1/2 to 46 1/2 to 47 1/2 to 48 1/2 to 49 1/2 to 50 1/2 to 51 1/2 to 52 1/2 to 53 1/2 to 54 1/2 to 55 1/2 to 56 1/2 to 57 1/2 to 58 1/2 to 59 1/2 to 60 1/2 to 61 1/2 to 62 1/2 to 63 1/2 to 64 1/2 to 65 1/2 to 66 1/2 to 67 1/2 to 68 1/2 to 69 1/2 to 70 1/2 to 71 1/2 to 72 1/2 to 73 1/2 to 74 1/2 to 75 1/2 to 76 1/2 to 77 1/2 to 78 1/2 to 79 1/2 to 80 1/2 to 81 1/2 to 82 1/2 to 83 1/2 to 84 1/2 to 85 1/2 to 86 1/2 to 87 1/2 to 88 1/2 to 89 1/2 to 90 1/2 to 91 1/2 to 92 1/2 to 93 1/2 to 94 1/2 to 95 1/2 to 96 1/2 to 97 1/2 to 98 1/2 to 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645 1/2 to 646 1/2 to 647 1/2 to 648 1/2 to 649 1/2 to 650 1/2 to 651 1/2 to 652 1/2 to 653 1/2 to 654 1/2 to 655 1/2 to 656 1/2 to 657 1/2 to 658 1/2 to 659 1/2 to 660 1/2 to 661 1/2 to 662 1/2 to 663 1/2 to 664 1/2 to 665 1/2 to 666 1/2 to 667 1/2 to 668 1/2 to 669 1/2 to 670 1/2 to 671 1/2 to 672 1/2 to 673 1/2 to 674 1/2 to 675 1/2 to 676 1/2 to 677 1/2 to 678 1/2 to 679 1/2 to 680 1/2 to 681 1/2 to 682 1/2 to 683 1/2 to 684 1/2 to 685 1/2 to 686 1/2 to 687 1/2 to 688 1/2 to 689 1/2 to 690 1/2 to 691 1/2 to 692 1/2 to 693 1/2 to 694 1/2 to 695 1/2 to 696 1/2 to 697 1/2 to 698 1/2 to 699 1/2 to 700 1/2 to 701 1/2 to 702 1/2 to 703 1/2 to 704 1/2 to 705 1/2 to 706 1/2 to 707 1/2 to 708 1/2 to 709 1/2 to 710 1/2 to 711 1/2 to 712 1/2 to 713 1/2 to 714 1/2 to 715 1/2 to 716 1/2 to 717 1/2 to 718 1/2 to 719 1/2 to 720 1/2 to 721 1/2 to 722 1/2 to 723 1/2 to 724 1/2 to 725 1/2 to 726 1/2 to 727 1/2 to 728 1/2 to 729 1/2 to 730 1/2 to 731 1/2 to 732 1/2 to 733 1/2 to 734 1/2 to 735 1/2 to 736 1/2 to 737 1/2 to 738 1/2 to 739 1/2 to 740 1/2 to 741 1/2 to 742 1/2 to 743 1/2 to 744 1/2 to 745 1/2 to 746 1/2 to 747 1/2 to 748 1/2 to 749 1/2 to 750 1/2 to 751 1/2 to 752 1/2 to 753 1/2 to 754 1/2 to 755 1/2 to 756 1/2 to 757 1/2 to 758 1/2 to 759 1/2 to 760 1/2 to 761 1/2 to 762 1/2 to 763 1/2 to 764 1/2 to 765 1/2 to 766 1/2 to 767 1/2 to 768 1/2 to 769 1/2 to 770 1/2 to 771 1/2 to 772 1/2 to 773 1/2 to 774 1/2 to 775 1/2 to 776 1/2 to 777 1/2 to 778 1/2 to 779 1/2 to 780 1/2 to 781 1/2 to 782 1/2 to 783 1/2 to 784 1/2 to 785 1/2 to 786 1/2 to 787 1/2 to 788 1/2 to 789 1/2 to 790 1/

CLASSIFICATION OF TIN PLATE.

In the form of a handsome card suitable for tacking up in the office, Messrs. Charles S. Trench & Co., metal brokers, 234 Pearl street, New York City, have issued a graded and alphabetically arranged classification of tin plates. Four general classes of tin plates are recognized—namely, charcoal tin plates, coke tin plates, charcoal ternes and coke ternes. Referring to charcoal tin plates, five general grades are recognized: First, extra quality; second, Melyn grade; third, Calland grade; fourth, Allaway grade, and, fifth, steel plates, coke finish. The Allaway grade is subdivided into prime steel plates, old

brands and ordinary. In several of these grades subdivisions are recognized. Those plates most nearly approaching the standard are placed first; then, after a vertical dash in the column, others are given which do not quite come up to standard in the estimation of Messrs. Trench & Co., and so on, thus indicating their ideas of the actual quality of the plates named. As being of interest to our readers, we publish the classification in full herewith, remarking that it is one of the most important additions to the literature of tin plates that has been recently made. Those of our readers who have the good fortune to have the large card which we have mentioned above, will probably find it

serviceable if tacked up near desks in their shops where it can be referred to when plates are quoted by brands, or when traveling salesmen are soliciting orders for plates of certain grades. It must be borne in mind that the classification given is only that of a prominent firm of metal brokers, and that other houses may take exception to some of the conclusions which Messrs. Trench & Co. have reached. It is possible, too, that manufacturers in some instances may claim that injustice has been done to their brands, but in the absence of any more definite standard the trade are warranted in attaching great importance to a classification presented by a firm which aims to serve the best interests of its patrons:

Table Showing Classification of Tin and Terne Plates, Issued by Charles S. Trench & Co., New York.

CHARCOAL TIN PLATES.			COKE TIN PLATES.								
Extra Quality. (Not graded.)	Melyn Grade.	Calland Grade.	Allaway Grade.			Steel Plates. Coke Finish.	A B Grade.	Yspity Grade.	J B Grade.	B V Grade.	Lantwit Grade.
			Prime Steel	Old Brands.	Ordinary.						
Cookley K	E C C	Calland	Alma	Abercarne	Alyn	A B	Derwent	Clifrew	Ashford	Horton	B F
Falcon	Melyn		Burrows	Alman	Bedil	A C	Hawkwell	Glyn	Iolo	Ebbw	E V
Hendy	P S & Co	Homo	Camaret	Bailey	Arley	Alpha		J B	Aican	L F	Kentledge
K C B	Talbot	Manor Best	Devon	Martham	Avondale	Brenin	Oldcastle	Alyn	L L D	Lantwit	Swansea
M F	S. Dulais	Dunstan	Cwmfelin	Beaufort	Capitol	Beauport	Rhine	Bissoe	Lydbrook		
Tregoning	Bradley	Gelert	Gilbertson	Baglan	Cambrian	Cookley	Yspity	Sartoris	B V	Menai	
Gwendreath		Garfield	Heron	Burry	Clifton	C O	R N B	Byass	M & J		
Killey	Denver	Grassmere	L R B	B S C	Cwmfelin			Mersey	Mersey		
L P L	Energy		Machen	Cwmavon	Don			Caldicot	Midland		
Osier Bed	Forbes	Neath	Monnow	Dell	Elm			Clyne	Mold		
Trevarth	Granada	Kenfig	Neath	Delta	Elba			Clwyd	Moriais		
V R	V S	Parkend	D R D	Glan	Lando			C F	Neath		
		Eagle	E V	Goodwood	Llandillo			Cwmdu	Nantyglo		
		P D	Hexan	Madoc				Cymro	Nelson		
		P N	Gwthion	Katherine	Nellie			Deri	Newton		
		P M	Garth	Knox	Nofold			Dowla	Pen		
Berkley	Pontpool	Gloster	Jumbo	Oak				E A P	P. Dulais		
Birch	Irvin	H F	Lannmore	Onen				Frood	P P M		
Daren	R G	Lett	Osborn					Flint	Rudry		
Grange	Jensen	Oban	O C					Gelly	Severn		
Guest	Tawe Llewellyn	Laurel	Penwilt	O & B				Gifwen	Strick		
Hermon	Vole	Premier	Parsons Best					Garnant	Tielo		
Lydney	Langham	Primate	Pentre					Glaes	Trigva		
Panteg	Lanson	Rhos	Rhos					Glaslyn	Tonna		
Towy	Millwood	Ruperra	S & Co					Grenig	Texas		
Tinto	O F P P	Suez	Tiroan					Gurnos	Troy		
	Pontynewydd	Sardis	U F					Giantwa	P D		
	Sarn	Ucha	Velindre					Hensol	Usk		
Pontymister	Siluria							Hive	Varna		
	Ynis							H F S	Wenau		

CHARCOAL TERNEs.			COKE TERNEs.				
Extra Quality. (Not graded.)	Melyn Grade.	Dean Grade.	Mansel Grade.	Abercarne Grade.	Common Allaway Grade.	Glaes Grade.	
			Steel.	Iron.	1	2	
Trevoig	E C C	Alyn	Mansel	Arda	Abercarne	Alfred	C F
Old Process	Melyn	Dean	L R B	Alma	Arran	Carlton	Alcan
Pontymister	Talbot	Gwendreath		Beaufort	Bear	B V	P B
Old Style		Pontymister		Arley	D G		Celyn
Silva		P T L		Bowness	Gloster	Lydbrook	Carno
Mostyn	L P L	S T P		Duffryn	Gilbertson	Frood	
Old Style		L		Cornell	Irvon	Gilwen	
Old Process		Unicorn		Machen	Excelsior	Gelly	
M F		Worcester		T J & Co.	Langham	States	
				Victor	Ynis	States	

INDUSTRIAL ITEMS.

MASSACHUSETTS.

The edge-tool works of A. W. Crossman & Son, at West Warren, will add sufficient machinery to the plant within the next three months to nearly double the production. Nickel-plating works, and probably larger turbines, will also be put in. The concern now make about 1000 kinds and sizes of edge-tools.

The Holt Manufacturing Company—capital, \$15,000—will manufacture hardware and mechanics' tools at Springfield.

An extensive cut in wages has been announced at the factory of the Waltham Watch Company. The existing rates will be reduced from 5 to 50 per cent., and the cut will reduce the pay-roll 10 per cent. Competition is stated to be the cause for this action, and for the recent discharge of some 40 hands the same reason is given.

CONNECTICUT.

The Farrel Foundry and Machine Company, of Ansonia, have undertaken and successfully poured what is probably the largest hollow chilled roll in this country. It is 13 feet long on the face, 17 feet over all, and 30 inches in diameter, requiring about 14 tons of iron to cast it.

NEW YORK.

The molders employed at the Bent Foundry, Fort Chester, struck last week upon being notified of a 20 per cent. reduction in their wages. Their places have not yet been filled.

PENNSYLVANIA.

The foundries of the Reading Hardware Company are closed on account of the strike of the molders against the 10 per cent. reduction.

One of the mechanical puddlers in the West Mill of the Phoenix Iron Company, at Phoenixville, exploded on January 25, owing, it is supposed, to a lump of ice or snow getting into the cylinder. General Superintendent Reeves and J. T. Nichols, in charge of the mill, were knocked down, but no one was hurt.

The Wilkesbarre Iron Fence and Screen Manufacturing Company opened work in their screen department on Monday, January 21, and the two branches of industry carried on by the company serve to make the workshop a busy one.

The Pottstown Iron Company intend erecting a universal plate and shape mill of large dimensions as an addition to their present extensive works.

The Newcastle Iron Works, familiarly known as the "Sheet Mill," and until within a short time ago operated by Reis Brothers,

who recently failed, was sold again Friday last on a mortgage of \$12,000 at \$61,000. It is understood that this divests it of all liens and gives a clear title. T. M. Sweeny, acting for the Kimberleys, was the purchaser, and it is said that it will soon be put in operation. The employees have been paid 50 per cent. of the money due them when the firm failed, the total amount due being about \$10,000.

The Greenwood Rolling Mill, at Tamaqua, after six months' idleness on account of financial difficulties, resumed operations last week under the superintendence of John Ralston, the receiver. It will run on muck bar iron, and at first will employ but 50 men. It is expected to increase the force from time to time until the full complement of men is again employed. The idleness of the mill for the past half year has had a very depressing influence in Tamaqua, and its resumption is hailed with much pleasure.

The new nail mill of Reuben Johnson & Co., at Northumberland, has been completed and the furnaces started.

The nail factory of McLanahan, Smith & Co., at Hollidaysburg, which has been idle for about six weeks, resumed operations on January 22. The rolling mill is still idle.

The Parkesburg Iron Works, which have been stopped for repairs, are again in full blast.

Arrangements are being made by the Phoenix Iron Company, at Phoenixville, to roll 4-inch steel deck beams. They have been successful in rolling 6, 7 and 8 inch beams, and will no doubt be equally so with the 9-inch.

A reduction of 12 per cent. in wages at the mill of the Montour Iron and Steel Company, at Danville, has brought the puddlers out. The mill is idle, and the managers evince no great desire to run unless the reduction be accepted.

It is reported that a strike is threatened at the new Danville Nail Works.

Macungie Furnace, owned by the Macungie Iron Company, at Reading, started on January 22, after month's idleness.

The Hartford Breaker, at Ashley, under lease to the Philadelphia and Reading Coal and Iron Company, has been burned. This fire throws 600 men out of employment. The firm on the breaker is \$100,000.

All five stacks of the Allentown Iron Company are now out of blast. It is probable that the company will shortly undergo reorganization, and that the furnaces, which are of somewhat antiquated style, will be remodeled. The Allentown Iron Company is one of the pioneers in the manufacture of iron, and for years was among the largest

producers of iron in this country. The plant is a valuable one, and it is to be hoped that under reorganization new life will be infused into the establishment and work given to a large force of men.

Application is to be made for a charter by a corporation, to be known as the Jefferson Coal Company, which will mine coal in Jefferson County. The capital stock will be \$500,000, and the office will be located in Bethlehem. The directors are E. P. Wilbur, G. B. Linderman, and Warren A. Wilbur, of Bethlehem; R. Abbott, of South Bethlehem, and A. C. Yates, of Rochester, N. Y.

The Chickies Iron Company recently presented \$1680 to those of their employees who remained with them the past year, for their good behavior and faithful services, each man receiving a certain percentage on the amount he earned.

The Plymouth Rolling Mill Company have contracted to furnish the Philadelphia and Reading Railroad with 50,000 tons of crushed cinder, and are about to erect a very large crusher at their furnaces in Conshohocken to prepare the cinder for delivery. The crusher will probably give employment to 20 additional hands.

PITTSBURGH AND VICINITY.

The old firm of Kirkpatrick & Co. has been dissolved and the business continued under the name of Kirkpatrick & Co., Limited. Mr. Barker C. Willson, long connected with the firm, now appears as treasurer of the new corporation.

The Republic Iron Company, Limited, have started up their mill double turn.

The Homestead Steel Works will start up in all departments as soon as the repairs which are now in progress are completed.

Natural gas has already taken the place of coal at the mill of Dilworth, Potter & Co., and at the glass works of Doyle & Co., Macbeth & Co. and Adams & Co. A saving of 10 per cent. is claimed to be effected in this method of heating. There is some talk of putting down test wells in the Twenty-seventh and Thirtieth wards, as it is thought a vein exists there.

The statement that Jones & Laughlin, Limited, are increasing the number of puddling furnaces in their works is pronounced by the firm to be untrue.

The Oliver & Roberts Wire Company are building a rolling mill, in addition to their wire works, for the manufacture of wire rods. The new building will be completed in about two months, and will be the only rod mill in the city.

The reduction of time of the night-turn

men at the McKeesport National Tube Works has been quietly accepted by the men, and

Wholesale Hardware Prices, January 30, 1884.

(For Wholesale Metal Prices, See Page 25.)

HARDWARE.

The Iron Age Directory

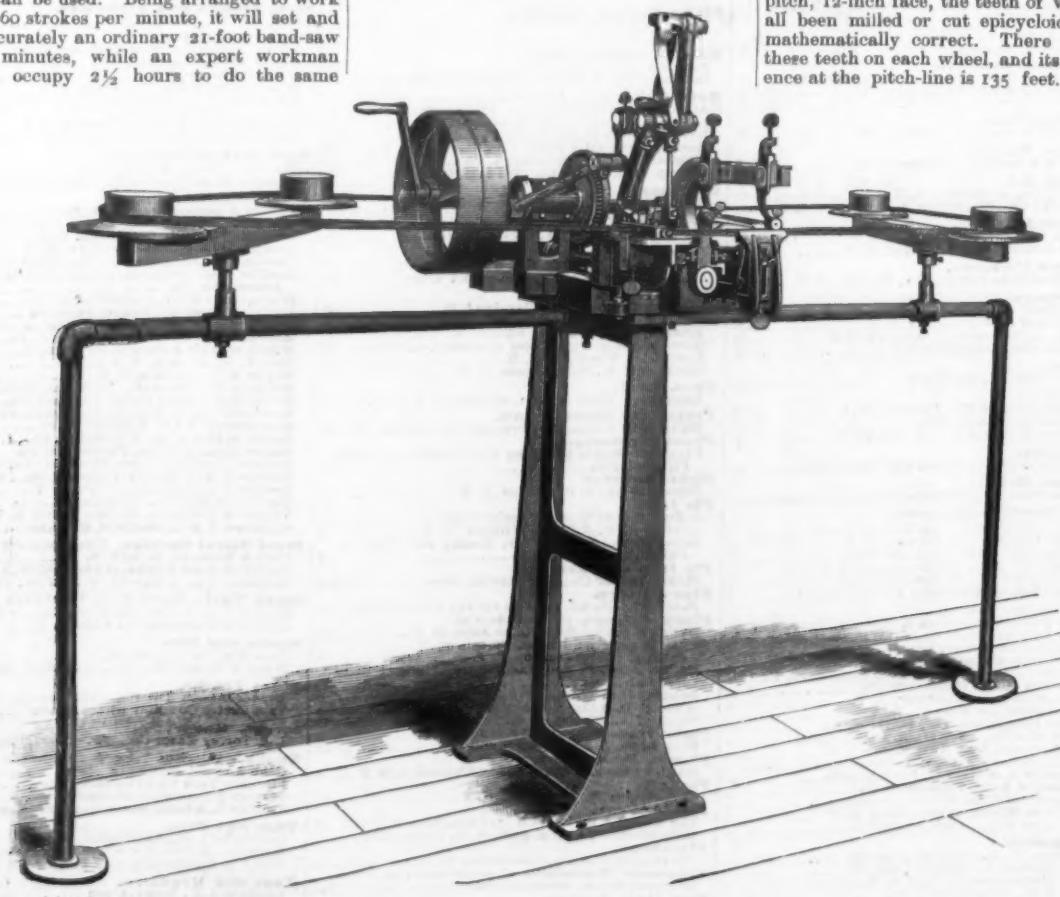
And Index to Advertisements.

Adjustable Links.	P. 52
Ewald Over, Indianapolis, Ind.	31
Agricultural Implements.	
Ewald Over, Indianapolis, Ind.	31
tenant Far Mill and Cradle Co., Melrose, N. Y.	9
Nash & Bro., Willington, N. J.	14
Air Compressors.	
Clayton Steam Pump Works, Brooklyn, N. Y.	44
The Norwalk Iron Works Co., S. Norwalk Conn.	43
Alarm Money Drawers.	
Oneida Alarm Till Co., East Syracuse, N. Y.	35
Tucker Alarm Till Co.	10
Anti-Friction Metals.	
Du Plaine E. A. C., Chicago, Ill.	46
Keever Paul S., Philadelphia.	46
Aviles. Manufacturers of.	
Boker Hermann & Co., 101 and 103 Duane, N. Y.	25
Cheney Avil & Vise Co., Detroit, Mich.	13
Field, Alfred & Co., 93 Chambers, N. Y.	3
Fisher & Norris, Trenton, N. J.	9
Arms and Ammunition.	
The Alford & Berkely Co., 77 Chambers, N. Y.	28
Field Alfred & Co., 93 Chambers, N. Y.	28
Remington & Sons, 283 Broadway, N. Y.	40
Smith, Otto A., Rockfall, Conn.	36
Stevens J. & Co., Chicopee Falls, Mass.	12
Artesian Well Supplies.	
Lovedge, John F., 101 Readie, N. Y.	35
Asbestos.	
The Asbestos Packing Co., Boston, Mass.	34
Atomizers.	
Rowland, Thos. F., Brooklyn, N. Y.	11
Axes.	
Cook R. & Sons, Winnetka, Conn.	13
Gauthier Steel Dpt. of Cambria Iron Co., Johnstown, Pa.	32, 33
Liggett Spring and Axe Co., Pittsburgh, Pa.	8
Wurster F. W., Brooklyn, N. Y.	46
Bags.	
Peek A. G. & Co., Cohoes, N. Y.	46
Bankers.	
P. W. Gallaudet & Co., 2 Wall, N. Y.	23
Barb Wire and Fence.	
Hawk Eye Steel Barb Fence Co., Burlington, Iowa.	3
Haish J. & Co., DeKalb, Ill.	31
Iowa Barb Wire Co., 8 Liberty, N. Y.	2
Washburn & Moen Mfg. Co., Worcester, Mass.	2
Barb Wire Machinery.	
Stover Bros. Co., Freeport, Ill.	34
Bellows. Manufacturers of.	
Bullock T. H., Cleveland, O.	8
Placcus M. & Son, Pittsburgh, Pa.	44
Scott Geo. M., Chicago, Ill.	32
Bells (Sleigh).	
Bevin Bros. Mfg. Co., Easthampton, Conn.	14
Beltings. Makers of.	
Alexander Bros., 412 N. 3d, Philadelphia.	25
N. Y. Belting and Packing Co., 52 Park Row, N. Y.	13
Page Belting Co., Concord, N. H.	15
Bicycles.	
Pope Mfg. Co., 497 Washington, Boston.	46
Bird Cages. Makers of.	
Lindeman O. & Co., 24 Pearl, N. Y.	4
Jewett John C. & Sons, Buffalo, N. Y.	28
Pierce Geo. N. & Co., Buffalo, N. Y.	31
Maxwell John, 247 and 249 Pearl, N. Y.	7
Blk. Braces.	
Saxton E. R., Buffalo, N. Y.	12
Bit Gauges.	
Millers Falls Co., 74 Chambers, N. Y.	46
Blasting Materials.	
Hercules Powder Co., Cincinnati O.	31
Blocks, Tackles. Makers of.	
Barnall & Loud, Boston, Mass.	42
Cleveland Block Co., Cleveland, O.	14
McCoy & Sanders, 26 Warren, N. Y.	40
McMillan Wm. H. & Bro., 113 South, N. Y.	45
Michigan Block Works, Detroit, Mich.	7
Pennell Block Co., Lockport, N. Y.	14
Bolier Feeders.	
The Miller Co., Canton, O.	33
Bolters. Steam.	
Babcock & Wilcox Co., 30 Cortlandt, N. Y.	32
Edge Moor Iron Company, 70 Liberty, N. Y.	15
Harrison Boiler Works, Philadelphia, Pa.	45
Lowe & Watson, Bridgeport, Conn.	39
Bolt and Rivet Clippers.	
Chambers, Brother & Co., Philadelphia, Pa.	14
Bolt Cutters.	
Howard Iron Works, Buffalo, N. Y.	36
National Machinery Co., Tiffin, O.	42
Wiley & Russell Mfg. Co., Greenfield, Mass.	30
Bolts.	
Wm. H. Haskell Co., Pawtucket, R. I.	43
Pawtucket Mfg. Co., Pawtucket, R. I.	43
Books.	
W. T. Comstock, 6 Astor Place, N. Y.	34
Boring Machines.	
W. B. Wells Mfg. Co., Ashaway, R. I.	42
Boxes for Hardware.	
Green E. H., 12 Murray, N. Y.	31
Braes, Manufacturers of.	
Alamont Brass and Copper Co., 19 Cliff, N. Y.	280
Bridgeport Brass Co., Bridgeport Conn.	2
Brown & Bros., 81 Chambers, N. Y.	2
Daval John & Sons, 10 John, N. Y.	2
Detroit Copper and Brass Rolling Mills, Detroit, Mich.	2
Holmes, Booth & Haydens, 49 Chambers, N. Y.	2
Plume & Atwood Mfg. Co., 12 Murray, N. Y.	2
Rome Iron Works, 70 Liberty, N. Y.	2
Scovill Mfg. Co., 221 Broome, N. Y.	2
Waterbury Mfg. Co., 26 Broadway, N. Y.	2
Waterbury Mfg. Co., Waterbury, Conn.	3
Braes Butt Hinges.	
Tiebout W. J., 16 and 18 Chambers, N. Y.	23
Braes Founders.	
McFarland Wm., Trenton, N. J.	45
Seevs Paul S., Philadelphia.	60
Reynolds Martin, Brooklyn, N. D., N. Y.	44
Bridge Builders.	
Moseley Iron Bridge and Roof Co., 5 Dey, N. Y.	4
Buckets, Pump and Elevator.	
Crosby A. D., Cuba, N. Y.	36
Rowland T. F., Brooklyn, N. Y.	46
Builders' Hardware.	
Clark Mfg. Co., Buffalo, N. Y.	32
Simick & Brittan Mfg. Co., Pittsburgh, Pa.	33
Whipple Mfg. Co., Cleveland, O.	13
Sutler and Shoe Knives. Manufacturers of.	
Wilson John, Sheffield, England.	10
Botts and Hinges.	
Smith & Egle Mfg. Co., Bridgeport, Conn.	10
Stanley Works, New Britain, Conn.	37
Union Mfg. Co., 56 Chambers, N. Y.	7
Can Openers.	
Andress Thos. J., Philadelphia, Pa.	14
Car Axles.	
Roberts A. & P. Co., 58, 5th, Philadelphia.	5
Carriage Bolts. Makers of.	
Townsend, Wilson & Hubbard, Philadelphia.	43
Carriage Hardware. Makers of.	
E. D. Clapp Mfg. Co., 100 Chambers, N. Y.	8
Eberhard Mfg. Co., Cleveland, O.	34
Smith H. D. Co., Plantville, Conn.	12
Woodruff, Miller & Co., Mount Carmel, Conn.	15
Carts.—C. Spring Cart Co.	
Rushville, Ind.	
Union Mfg. Co., Chicago, Ill.	10
Yale Co., New Haven, Ct.	41
Castings, Brass and Iron.	
Moore S. L. & Sons, Elizabeth, N. J.	32
Whipple Mfg. Co., Cleveland, O.	13
Castings, Iron.	
Bowler & Co., Cleveland, Ohio.	9
S. Cheney & Son, Mansfield, N. Y.	23
Devlin Thos. & Co., Providence, R. I.	7
Eberhard Mfg. Co., Cleveland, O.	35
Hill & Clark, Albany N. Y.	35
Hammer & Co., Branford, Conn.	35
North Brothers, Philadelphia, Pa.	35
Syracuse Malleable Iron Works, Syracuse, N. Y.	4
Castings, Steel.	
Chestnut Steel Castings Co., 507 Library, Phila., Pa.	46
Eureka Cast Steel Co., Chester, Pa.	46
Flage Stagg G. & Co., Philadelphia.	46
Johnson L. G. & Co., Styertes Duyvil, N. Y.	46
Mackintosh, Hemphill & Co., Pittsburgh, Pa.	46
Pittsburgh Steel Casting Co., Pittsburgh, Pa.	46
Chambers. Manufacturers of.	
Badco & Co., 56 Richmond St., Phila., Pa.	5
Chemists.	
Haines R., Philadelphia.	5
Eimer & Amend, 205 Third Ave., N. Y.	39
Chileotis. Manufacturers of.	
Buck Bros., Milbury, Mass.	13
Fardee A. & Co., 111 Broadway, N. Y.	38
Office and Spice Mills.	
Lane Brothers, Newark, N. J.	36
Enterprise Mfg. Co., Philadelphia, Pa.	36
Chester-Schoonmaker J. M., Pittsburgh, Pa.	
Chester-Schoonmaker J. M., Pittsburgh, Pa.	34
Compasses and Calipers. Manufacturers of.	
Temla & Call Hdw. & Tool Co., Springfield, Mass.	31, 36
Stevens J. & Co., Chicopee Falls, Mass.	35
Chester. Brown & Bros., 8 Chambers, N. Y.	
New Haven Copper Co., 29 Pearl, N. Y.	2
Fope, Cole & Co., Baltimore, Md.	2
Cordage.	
Albright-Porter Steam Cordage Co., 45 South, N. Y.	25
Hartmann Le Doux & Maccker.	40
Corrugated Iron.	
Cincinnati Corrugating Co., Cincinnati, O.	40
Cotter Springs, &c.	
Dunbar Bros., Bristol, Conn.	7
Clethes Dryers.	
Hill Dryer Co., Worcester, Mass.	10
Coal. Miners of.	
Duck Bros., Milbury, Mass.	13
Fardee A. & Co., 111 Broadway, N. Y.	38
Office and Spice Mills.	
Lane Brothers, Newark, N. J.	36
Enterprise Mfg. Co., Philadelphia, Pa.	36
Cook-Schoonmaker J. M., Pittsburgh, Pa.	
Cook-Schoonmaker J. M., Pittsburgh, Pa.	34
Compasses and Calipers. Manufacturers of.	
Temla & Call Hdw. & Tool Co., Springfield, Mass.	31, 36
Stevens J. & Co., Chicopee Falls, Mass.	35
Copper. Brown & Bros., 8 Chambers, N. Y.	
New Haven Copper Co., 29 Pearl, N. Y.	2
Fope, Cole & Co., Baltimore, Md.	2
Cordage.	
Albright-Porter Steam Cordage Co., 45 South, N. Y.	25
Hartmann Le Doux & Maccker.	40
Corrugated Iron.	
Cincinnati Corrugating Co., Cincinnati, O.	40
Cotter Springs, &c.	
Dunbar Bros., Bristol, Conn.	7
Clethes Dryers.	
Hill Dryer Co., Worcester, Mass.	10
Coal. Miners of.	
Duck Bros., Milbury, Mass.	13
Fardee A. & Co., 111 Broadway, N. Y.	38
Office and Spice Mills.	
Lane Brothers, Newark, N. J.	36
Enterprise Mfg. Co., Philadelphia, Pa.	36
Cook-Schoonmaker J. M., Pittsburgh, Pa.	
Cook-Schoonmaker J. M., Pittsburgh, Pa.	34
Compasses and Calipers. Manufacturers of.	
Temla & Call Hdw. & Tool Co., Springfield, Mass.	31, 36
Stevens J. & Co., Chicopee Falls, Mass.	35
Copper. Brown & Bros., 8 Chambers, N. Y.	
New Haven Copper Co., 29 Pearl, N. Y.	2
Fope, Cole & Co., Baltimore, Md.	2
Cordage.	
Albright-Porter Steam Cordage Co., 45 South, N. Y.	25
Hartmann Le Doux & Maccker.	40
Corrugated Iron.	
Cincinnati Corrugating Co., Cincinnati, O.	40
Cotter Springs, &c.	
Dunbar Bros., Bristol, Conn.	7
Clethes Dryers.	
Hill Dryer Co., Worcester, Mass.	10
Coal. Miners of.	
Duck Bros., Milbury, Mass.	13
Fardee A. & Co., 111 Broadway, N. Y.	38
Office and Spice Mills.	
Lane Brothers, Newark, N. J.	36
Enterprise Mfg. Co., Philadelphia, Pa.	36
Cook-Schoonmaker J. M., Pittsburgh, Pa.	
Cook-Schoonmaker J. M., Pittsburgh, Pa.	34
Compasses and Calipers. Manufacturers of.	
Temla & Call Hdw. & Tool Co., Springfield, Mass.	31, 36
Stevens J. & Co., Chicopee Falls, Mass.	35
Copper. Brown & Bros., 8 Chambers, N. Y.	
New Haven Copper Co., 29 Pearl, N. Y.	2
Fope, Cole & Co., Baltimore, Md.	2
Cordage.	
Albright-Porter Steam Cordage Co., 45 South, N. Y.	25
Hartmann Le Doux & Maccker.	40
Corrugated Iron.	
Cincinnati Corrugating Co., Cincinnati, O.	40
Cotter Springs, &c.	
Dunbar Bros., Bristol, Conn.	7
Clethes Dryers.	
Hill Dryer Co., Worcester, Mass.	10
Coal. Miners of.	
Duck Bros., Milbury, Mass.	13
Fardee A. & Co., 111 Broadway, N. Y.	38
Office and Spice Mills.	
Lane Brothers, Newark, N. J.	36
Enterprise Mfg. Co., Philadelphia, Pa.	36
Cook-Schoonmaker J. M., Pittsburgh, Pa.	
Cook-Schoonmaker J. M., Pittsburgh, Pa.	34
Compasses and Calipers. Manufacturers of.	
Temla & Call Hdw. & Tool Co., Springfield, Mass.	31, 36
Stevens J. & Co., Chicopee Falls, Mass.	35
Copper. Brown & Bros., 8 Chambers, N. Y.	
New Haven Copper Co., 29 Pearl, N. Y.	2
Fope, Cole & Co., Baltimore, Md.	2
Cordage.	
Albright-Porter Steam Cordage Co., 45 South, N. Y.	25
Hartmann Le Doux & Maccker.	40
Corrugated Iron.	
Cincinnati Corrugating Co., Cincinnati, O.	40
Cotter Springs, &c.	
Dunbar Bros., Bristol, Conn.	7
Clethes Dryers.	
Hill Dryer Co., Worcester, Mass.	10
Coal. Miners of.	
Duck Bros., Milbury, Mass.	13
Fardee A. & Co., 111 Broadway, N. Y.	38
Office and Spice Mills.	
Lane Brothers, Newark, N. J.	36
Enterprise Mfg. Co., Philadelphia, Pa.	36
Cook-Schoonmaker J. M., Pittsburgh, Pa.	
Cook-Schoonmaker J. M., Pittsburgh, Pa.	34
Compasses and Calipers. Manufacturers of.	
Temla & Call Hdw. & Tool Co., Springfield, Mass.	31, 36
Stevens J. & Co., Chicopee Falls, Mass.	35
Copper. Brown & Bros., 8 Chambers, N. Y.	
New Haven Copper Co., 29 Pearl, N. Y.	2
Fope, Cole & Co., Baltimore, Md.	2
Cordage.	
Albright-Porter Steam Cordage Co., 45 South, N. Y.	25
Hartmann Le Doux & Maccker.	40
Corrugated Iron.	
Cincinnati Corrugating Co., Cincinnati, O.	40
Cotter Springs, &c.	
Dunbar Bros., Bristol, Conn.	7
Clethes Dryers.	
Hill Dryer Co., Worcester, Mass.	10
Coal. Miners of.	
Duck Bros., Milbury, Mass.	13
Fardee A. & Co., 111 Broadway, N. Y.	38
Office and Spice Mills.	
Lane Brothers, Newark, N. J.	36
Enterprise Mfg. Co., Philadelphia, Pa.	36
Cook-Schoonmaker J. M., Pittsburgh, Pa.	
Cook-Schoonmaker J. M., Pittsburgh, Pa.	34
Compasses and Calipers. Manufacturers of.	
Temla & Call Hdw. & Tool Co., Springfield, Mass.	31, 36
Stevens J. & Co., Chicopee Falls, Mass.	35
Copper. Brown & Bros., 8 Chambers, N. Y.	
New Haven Copper Co., 29 Pearl, N. Y.	2
Fope, Cole & Co., Baltimore, Md.	2
Cordage.	
Albright-Porter Steam Cordage Co., 45 South, N. Y.	25
Hartmann Le Doux & Maccker.	40
Corrugated Iron.	
Cincinnati Corrugating Co., Cincinnati, O.	40
Cotter Springs, &c.	
Dunbar Bros., Bristol, Conn.	7
Clethes Dryers.	
Hill Dryer Co., Worcester, Mass.	10
Coal. Miners of.	
Duck Bros., Milbury, Mass.	13
Fardee A. & Co., 111 Broadway, N. Y.	38
Office and Spice Mills.	
Lane Brothers, Newark, N. J.	36
Enterprise Mfg. Co., Philadelphia, Pa.	36
Cook-Schoonmaker J. M., Pittsburgh, Pa.	
Cook-Schoonmaker J. M., Pittsburgh, Pa.	34
Compasses and Calipers. Manufacturers of.	
Temla & Call Hdw. & Tool Co., Springfield, Mass.	31, 36
Stevens J. & Co., Chicopee Falls, Mass.	35
Copper. Brown & Bros., 8 Chambers, N. Y.	
New Haven Copper Co., 29 Pearl, N. Y.	2
Fope, Cole & Co., Baltimore, Md.	2
Cordage.	
Albright-Porter Steam Cordage Co., 45 South, N. Y.	25
Hartmann Le Doux & Maccker.	40
Corrugated Iron.	
Cincinnati Corrugating Co., Cincinnati, O.	40
Cotter Springs, &c.	
Dunbar Bros., Bristol, Conn.	7
Clethes Dryers.	
Hill Dryer Co., Worcester, Mass.	10
Coal. Miners of.	
Duck Bros., Milbury, Mass.	13
Fardee A. & Co., 111 Broadway, N. Y.	38
Office and Spice Mills.	
Lane Brothers, Newark, N. J.	36
Enterprise Mfg. Co., Philadelphia, Pa.	36
Cook-Schoonmaker J. M., Pittsburgh, Pa.	
Cook-Schoonmaker J. M., Pittsburgh, Pa.	34
Compasses and Calipers. Manufacturers of.	
Temla & Call Hdw. & Tool Co., Springfield, Mass.	31, 36
Stevens J. & Co., Chicopee Falls, Mass.	35
Copper. Brown & Bros., 8 Chambers, N. Y.	
New Haven Copper Co., 29 Pearl, N. Y.	2
Fope, Cole & Co., Baltimore, Md.	2
Cordage.	
Albright-Porter Steam Cordage Co., 45 South, N. Y.	25
Hartmann Le Doux & Maccker.	40
Corrugated Iron.	
Cincinnati Corrugating Co., Cincinnati, O.	40
Cotter Springs, &c.	
Dunbar Bros., Bristol, Conn.	7
Clethes Dryers.	
Hill Dryer Co., Worcester, Mass.	10
Coal. Miners of.	
Duck Bros., Milbury, Mass.	13
Fardee A. & Co., 111 Broadway, N. Y.	38
Office and Spice Mills.	
Lane Brothers, Newark, N. J.	36
Enterprise Mfg. Co., Philadelphia, Pa.	36
Cook-Schoonmaker J. M., Pittsburgh, Pa.	
Cook-Schoonmaker J. M., Pittsburgh, Pa.	34
Compasses and Calipers. Manufacturers of.	
Temla & Call Hdw. & Tool Co., Springfield, Mass.	31, 36
Stevens J. & Co., Chicopee Falls, Mass.	35
Copper. Brown & Bros., 8 Chambers, N. Y.	
New Haven Copper Co., 29 Pearl, N. Y.	2
Fope, Cole & Co., Baltimore, Md.	2
Cordage.	
Albright-Porter Steam Cordage Co., 45 South, N. Y.	25
Hartmann Le Doux & Maccker.	40
Corrugated Iron.	
Cincinnati Corrugating Co., Cincinnati, O.	40
Cotter Springs, &c.	
Dunbar Bros., Bristol, Conn.	7
Clethes Dryers.	
Hill Dryer Co., Worcester, Mass.	10
Coal. Miners of.	
Duck Bros., Milbury, Mass.	13
Fardee A. & Co., 111 Broadway, N. Y.	38
Office and Spice Mills.	
Lane Brothers, Newark, N. J.	36
Enterprise Mfg. Co., Philadelphia, Pa.	36
Cook-Schoonmaker J. M., Pittsburgh, Pa.	
Cook-Schoonmaker J. M., Pittsburgh, Pa.	34
Compasses and Calipers. Manufacturers of.	
Temla & Call Hdw. & Tool Co., Springfield, Mass.	31, 36
Stevens J. & Co., Chicopee Falls, Mass.	35
Copper. Brown & Bros., 8 Chambers, N. Y.	
New Haven Copper Co., 29 Pearl, N. Y.	2
Fope, Cole & Co., Baltimore, Md.	2
Cordage.	
Albright-Porter Steam Cordage Co., 45 South, N. Y.	25
Hartmann Le Doux & Maccker.	40
Corrugated Iron.	
Cincinnati Corrugating Co., Cincinnati, O.	40
Cotter Springs, &c.	
Dunbar Bros., Bristol, Conn.	7
Clethes Dryers.	
Hill Dryer Co., Worcester, Mass.	10
Coal. Miners of.	
Duck Bros., Milbury, Mass.	13
Fardee A. & Co., 111 Broadway, N. Y.	38
Office and Spice Mills.	
Lane Brothers, Newark, N. J.	36
Enterprise Mfg. Co., Philadelphia, Pa.	36
Cook-Schoonmaker J. M., Pittsburgh, Pa.	
Cook-Schoonmaker J. M., Pittsburgh, Pa.	34
Compasses and Calipers. Manufacturers of.	

The Smith Band-Saw Setting and Filing Machine.

Our annexed engraving represents a general view of the Smith band-saw setting and filing machine, which embodies some new and interesting features. The machine employs the ordinary three-cornered file, and does away with the necessity of purchasing special files of some particular design. The setting attachment is perhaps the most novel feature. The setting is accomplished by means of hammers on anvils having the desired angle. By this means the teeth will stay at that angle, and do not spring back, as is often the case with teeth set by a cam motion. The amount of set required can be adjusted to the greatest nicety. The machine, constructed to work by hand or power, has been designed with the purpose of imitating, as near as possible, the movements made in filing and setting band saws by hand, but at the same time to overcome the irregularity of the same, as shown by the high and low teeth in a blade after being hand-filed.

A three-cornered file from 3 to 6 inches long can be used. Being arranged to work about 60 strokes per minute, it will set and file accurately an ordinary 21-foot band-saw in 20 minutes, while an expert workman would occupy 2½ hours to do the same.



THE SMITH BAND-SAW SETTING AND FILING MACHINE.

amount of work. The head carrying the file has a reciprocating movement. In the forward movement the file is held down and the filing of the teeth takes place; in the return movement the file is lifted from the blade, and at the same time the self-feeding motion pushes forward another tooth in readiness for the return of the file. The feed can be instantaneously adjusted to suit the pitch of any saw, and is arranged to feed one or more teeth at a time. A device for holding the saw while being set or filed, as shown in the cut, is supplied. This machine lately received the medal of superiority in competition with the Amesbury machine at the American Institute, New York. It is manufactured by Messrs. Detrick & Harvey, Baltimore, Md.

Remarkable Work at Scranton.—The Republican for January 29 contains the following statement: "In converting steel by the Bessemer steel process, the pressure of blast used generally runs from 14 to 20 pounds per square inch. Few works have engines of capacity and power sufficient to maintain a pressure of over 25 pounds while blowing a heat. On Wednesday last, however, while blowing a heat in their converting works, the Scranton Steel Company maintained with their engines a continuous blast pressure of 50 pounds to the square inch. On Thursday last they went a step further, and performed the feat of blowing a heat in each of their two converters at the same time. The heats weighed 4½ tons each and were blown in 12 minutes. So far as known, both of these feats are without precedent at any Bessemer works elsewhere, and their performance shows the very unusual power of the company's engines."

On the State railways in Sweden there is generally a doctor for every 32 miles of line, and in this way 44 doctors are employed by the Government. The private railways have a similar system. The medical men examine all applicants for employment, and reject those physically disqualified, especially by defects of sight and hearing. They also give their services to all injured by accidents on the line, to regular employees and their families in sickness, to occasional employees while engaged in service, to laborers in the shops who have paid the same contribution as those engaged in working the line, and also to their families. No exception is made in the cases of those who suffer from injury or disease caused by their own fault.

A commendable movement in the way of putting electric wires under ground has at last been made in New York, the Fire Commissioners having recently resolved to run certain lines of the fire-alarm wires through subterranean conduits. Should the experiment prove successful, which will doubtless be the case, it will afford another demonstration of the practicability of underground wires, and ought to compel a speedy burial of all telephone, telegraph and electric-light lines in the city. What can be accomplished in this direction has recently again been shown in Philadelphia, an appreciable length of one of

the main streets having been illuminated by electric lights, the current being furnished through wires in underground conduits. The lamps were put up by the Underground Electric Light and Power Company, who for some time past have carried on operations in Philadelphia, and the experiments just concluded by them have yielded highly satisfactory results, both as regards quality of light and efficiency of working.

British Trade Prospects.

The founder of the well-known firm of John Brown & Co., Limited, of Sheffield, but who is not an active partner in any commercial industry, recently addressed a Sheffield audience on the state of trade, the report of which we take from an English exchange. He deplored the spirit of restlessness among artisans—a restlessness which might be termed unreasonable expectation. Wages, he said, could only be good when trade was good, and when manufacturers were able to pay high wages they were ready and willing to do so. His forecast of

Hermann Steel Works made 66,073,490 kg. (about 66,000 tons) of steel, against 60,277,000 kg. (about 60,000 tons) in the previous 12 months.

A Large Gear-Wheel.

A correspondent, writing from Scranton, Pa., under date of January 22, says: There is now standing in the main machine shop of the Dickson Manufacturing Company, this city, one of the largest wheels in the world, and the second of the kind ever made, the first having been already shipped for service to the copper mines of the Calumet and Hecla Mining Company, on the borders of Lake Michigan. The combined weight of both wheels is 124 tons, and their cost in place will not be less than \$50,000. The titanic wheel, which occupies a position in the center of the lofty and admirably equipped machine shop, is a marvel of mechanical ingenuity, strength and skill, and has been made from original designs furnished by E. D. Leavitt, Jr., of Cambridgeport, Mass. The spur-gear in the center is 43 feet in diameter at the pitch-line, 4½-inch pitch, 12-inch face, the teeth of which have all been milled or cut epicycloid, and are mathematically correct. There are 352 of these teeth on each wheel, and its circumference at the pitch-line is 135 feet. On each

RECENT BOOKS.

Hodgson.—Plaster and Plastering, Mortars and Cements. By Fred. T. Hodgson. 102 pages, 12mo, cloth, 1883, \$1

This book is a complete guide for the plasterer in the preparation and application of all kinds of plaster, stucco, Portland, hydraulic, Rosendale and other cements. The chemistry, qualities and uses of the various kinds of cements and liners are practically set forth, and rules are given for measuring, computing and valuing plaster and stucco work. The author has drawn freely from the best works on the subject, and has embodied in the book a large amount of information valuable to the trade. Under the head of "Miscellaneous Memoranda," a number of practical recipes are given. An illustrated Glossary of Terms used in plastering and plaster decorations adds to the value of the work.

Modern Architectural Designs and Details. 10½ by 14 inches, 80 full-page lith. plates, cloth, . . \$10

This work, which was published in parts during 1881, is the latest addition to the designs adapted for use among builders and architects, and is about the only volume which has given attention to the modern features of architecture which have appeared during the past few years. The drawings presented are from prominent architects of New York, Boston and other localities, and all the designs given are original in this work. Queen Anne, Eastlake, Elizabethan and other modernized styles are presented. A number of low-priced cottages, adapted to the requirements of the seaside and summer resorts, are included.

Interiors and Interior Details. With an Introduction, Description of Plates, and Notes on Wood Finish. By William B. Tuthill; 52 plates, 10 by 13½ inches, cloth; 1882, \$7.50

This work presents the principles which underlie successful interior finish and decoration. Some of the most able architects of New York, Boston, Chicago and Providence have contributed to its pages. It contains original designs of halls, staircases, parlors, libraries, dining-rooms, &c. There are also special designs in perspective, elevation and detail for low cost, medium and elaborate; furniture, sideboards, wood mantels, wood ceilings, doors and windows, wainscots, bank, office and store fittings. The suggestions are valuable, not only to architects and designers, but equally so to carpenters, builders and mechanics.

Baldwin.—Steam Heating for Buildings. By Wm. J. Baldwin; 3d edition, with many illus. plates, 234 pages, 12mo, cloth; 1882, \$2.50

This book is one of the most practically valuable that has appeared in a long while. It is especially adapted to steam-fitters, and contains directions for piping buildings and setting boilers properly, with descriptions of the most approved forms of apparatus for warming and ventilating private houses and large buildings, and for cooking purposes. There can be no opportunity for bungling work if the mechanic is familiar with Mr. Baldwin's excellent plans and suggestions.

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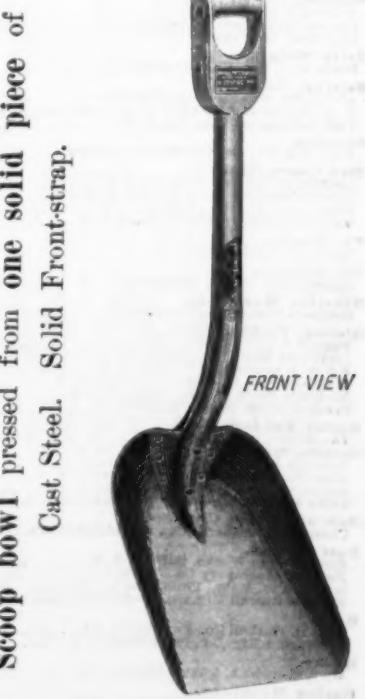
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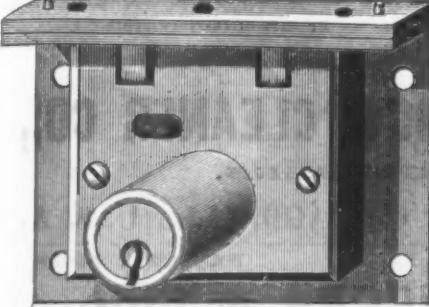
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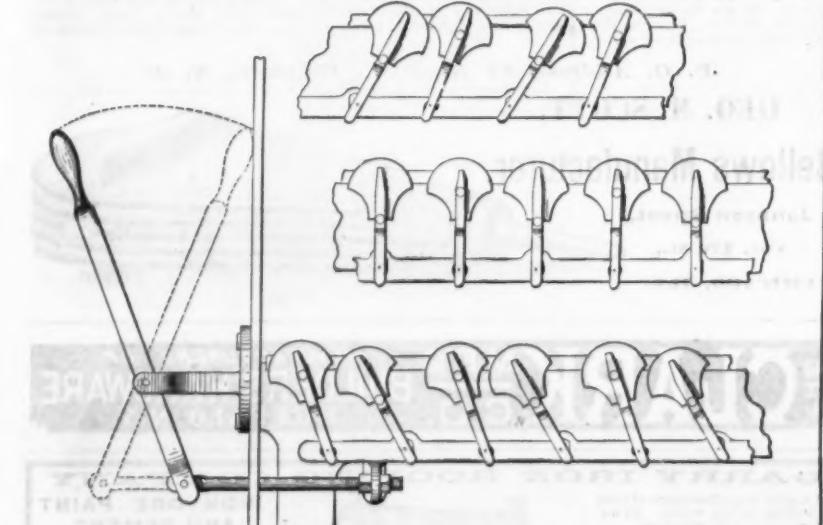
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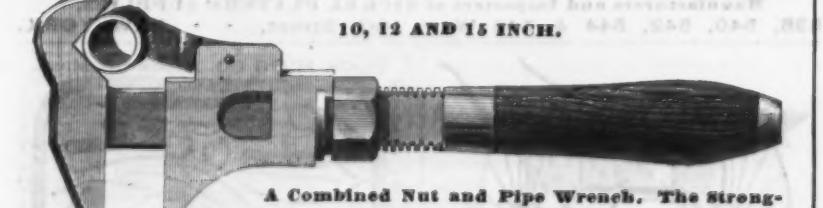
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The Attwell Sash Lock and Ventilator.

A new sash lock, quite different in its construction from those in general use with which the trade is familiar, is made by the Attwell Manufacturing Company, 162 Main street, Cincinnati, and is now just being put on the market. It has apparently novel features and advantages as a window fastening, and is called the "Attwell burglar-proof sash lock and ventilator." The accompanying Figs. 1 to 6 will make plain its construction and parts, and the manner of applying it to windows. It is made in two

Among the points in this device which commend it for practical use the following advantages are mentioned: The location of the locks in the window is at a point which renders their operation convenient to users, and, being mortised into the frame, they are not easily deranged, are inaccessible to a thief and difficult to force. These are features themselves well worthy of appreciation; but, aside from this, the lock affords additional security. The bolt being spring projected, the sash is automatically locked, and thus the necessity for the care (which may not be given) and the labor of closing is dispensed with. With the many

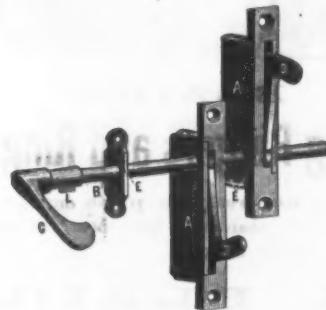


Fig. 1.



Fig. 2.



Fig. 4.

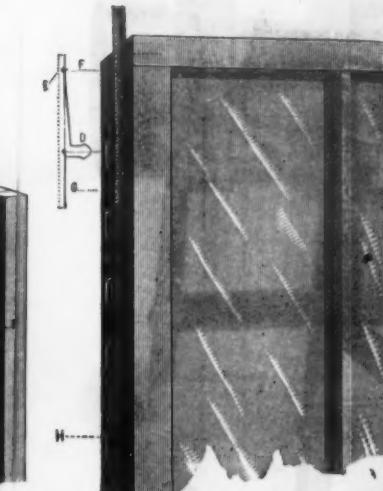


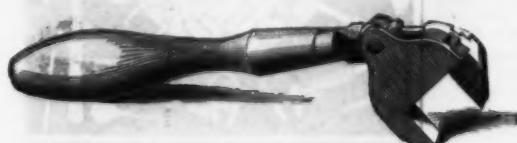
Fig. 5.

Fig. 6.

THE ATTWELL SASH LOCK AND VENTILATOR.

styles, according as it is to be used in windows which are hung with weights or in those when weights are not used.

Style A, which is illustrated in Fig. 1, is adapted to windows which are without weights, and may be described as follows: A, two locks (one controlling each sash) working in combination and operated by one key, which is removable at pleasure. B, escutcheon. C, removable key (made of malleable iron). D, bolts of locks (made of malleable iron) with flanged head, which, in conjunction with "strike," gives a "detent" to bolt when engaged—preventing the accidental falling of sash. E, center marks on locks and escutcheon given to facilitate the carpenter in his work of applying.



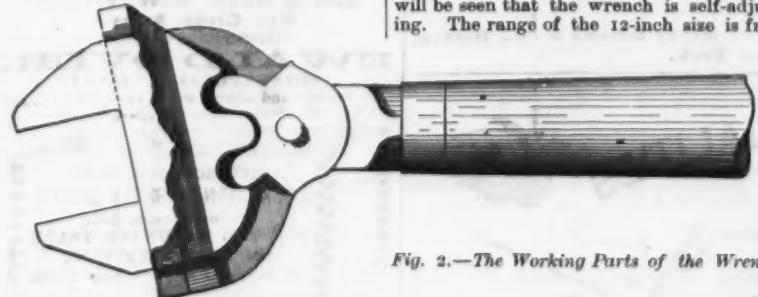
New Self-Adjusting Wrench.—Fig. 1.—General View.

Style B, illustrated in Fig. 2, is especially adapted to windows where weights are used. In this figure, A, B, C and E are the same as in Fig. 1. D, bolts of locks (made of malleable iron) without flanged heads—so shaped as to avoid the "detent"

locking points supplied, if ventilation or air is desired in sleeping apartments at night, the sash may be locked at any desired elevation or depression, and by removal of key (if sufficient space be not left for the admission of a thief's body) the result is obtained without any relinquishment of security. Then, too, where windows are without weights, or in case of breaking of sash cords, the operation of this lock serves to hold or control the sash.

Self-Adjusting Wrench.

A new self-adjusting wrench has been brought out by P. Lowenthal, of No. 278 Halsey street, Newark, N. J., and is shown in Figs. 1 and 2. The general appearance of the wrench may be gained from Fig. 1, while the arrangement of the working parts is shown in Fig. 2. It will be seen that the handle is pivoted to one of the jaws, and that its end is formed with cogs in such a manner as to engage with corresponding depressions in the sliding jaw. The effect of this is to cause the two jaws to approach each other and grasp the nut or other object to which they may be applied very tightly whenever the handle is moved for the purpose of turning them. The greater the resistance of the nut against turning, the tighter the wrench grasps it. From this it will be seen that the wrench is self-adjusting. The range of the 12-inch size is from



3/8 inch to 1 1/4 inches. Several sizes of the wrench are made, adapting it to use for almost all purposes that may be required.

A New Haven dispatch says that a movement is on foot among the Eastern ship-owners to compel an increase of the present coasting freight rates. Many of them are refusing cargoes at the present average rate of \$1.50 a ton from Baltimore for coasting transportation, as they say it does not pay them for the risk they take in making winter runs. The weather at this time of year is always severe, and this winter the gales off the New England coast have been heavier than for a quarter of a century before. Much damage has been done to Eastern coasting vessels, and this has probably led to the present movement. The ship-owners want the Eastern rate increased to \$1.75, as it was last summer.

Fig. 5 gives a sectional view, showing portion of window frame with locks A. A is inserted in mortises made in pulley stile, immediately to the left of meeting-rails of sash and on the right and left and next to parting bead. The escutcheon B is screwed on over hole which has been bored through reveal for admission of key, and the key C is partially inserted.

In Fig. 6 is given a section showing a portion of sash, in which are inserted the strike G, and H, when employed, and illustrating their position in relation to the locks.

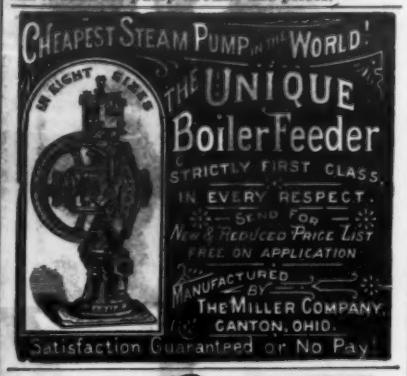
The English papers report that the Parliamentary notices for next session include two to provide tramway connections, by means of the continuous wire-cable system, in certain districts of Edinburgh, where, from the gradients, the introduction of ordinary tramways has been found impracticable.

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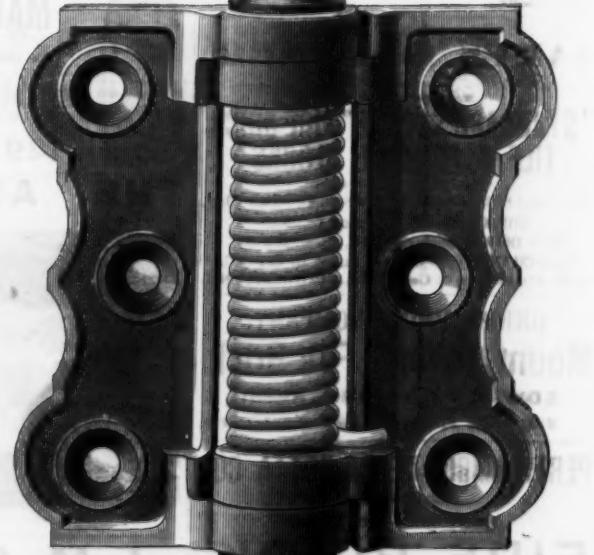
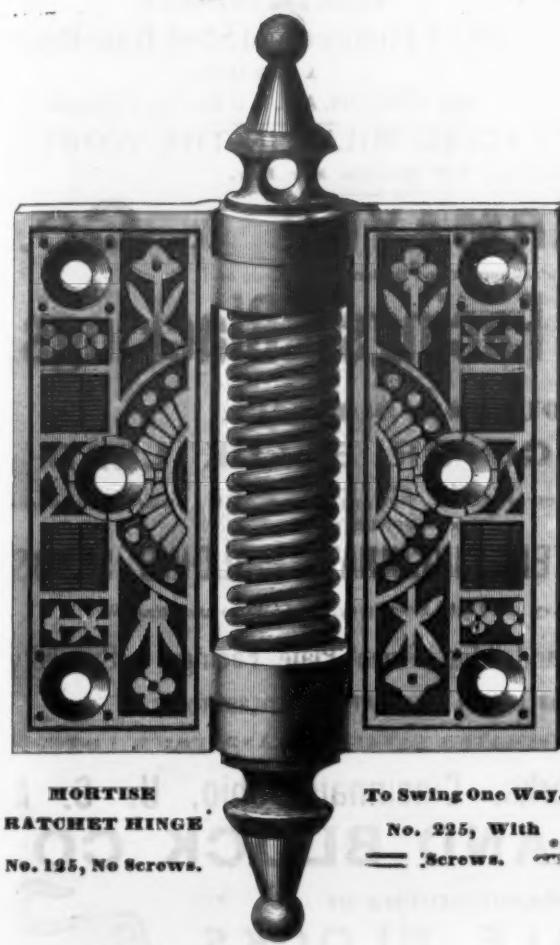
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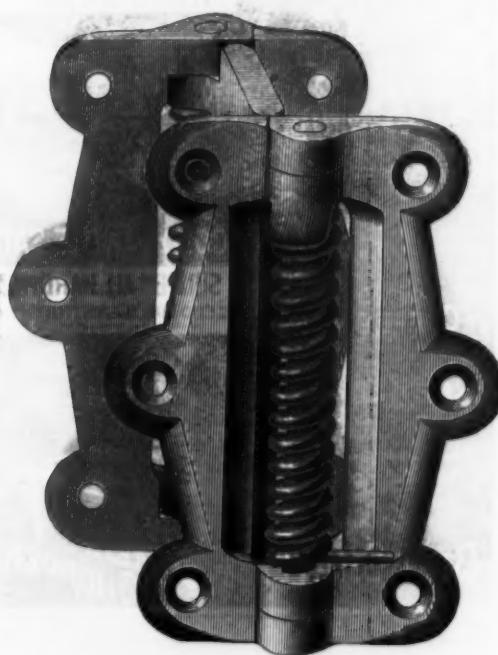
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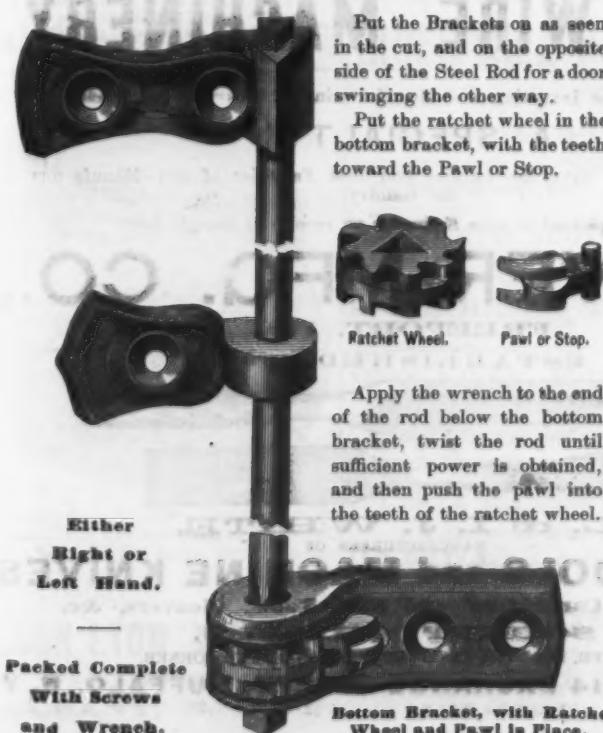
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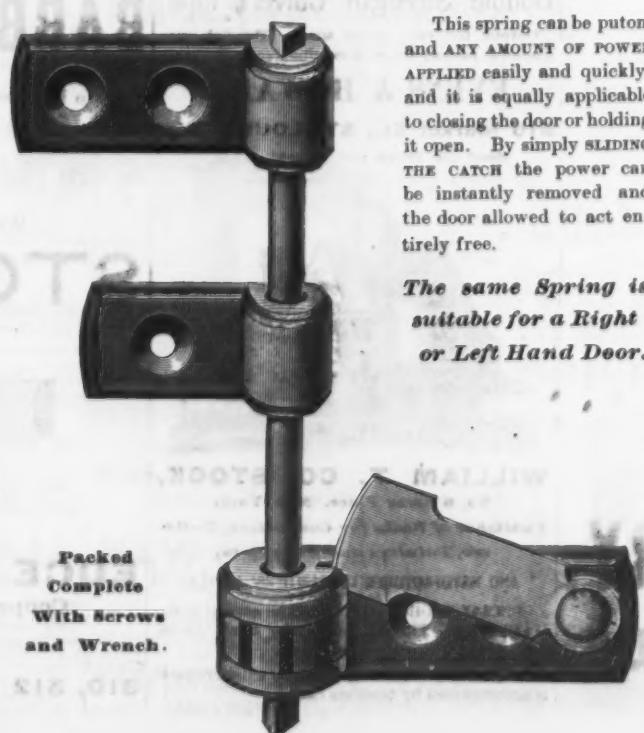
Put the Brackets on as seen in the cut, and on the opposite side of the Steel Rod for a door swinging the other way.

Put the ratchet wheel in the bottom bracket, with the teeth toward the Pawl or Stop.

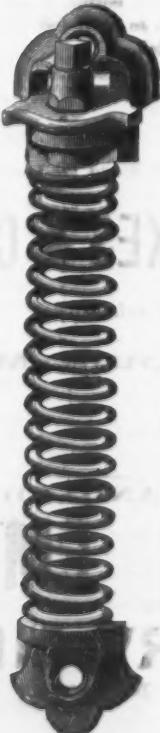
Apply the wrench to the end of the rod below the bottom bracket, twist the rod until sufficient power is obtained, and then push the pawl into the teeth of the ratchet wheel.

Packed Complete With Screws and Wrench.
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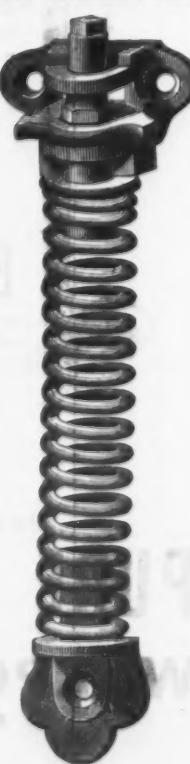
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Put on the top bracket first, and as near the edge as possible.
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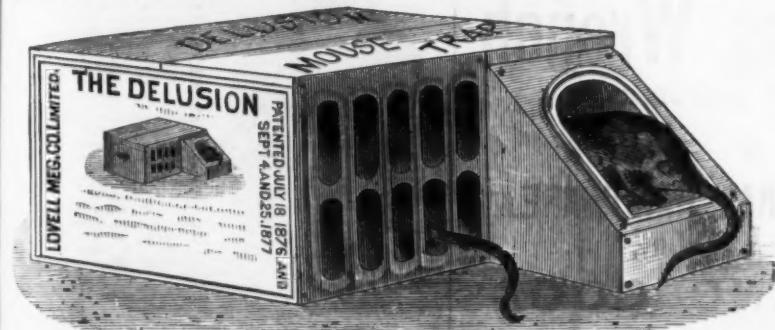
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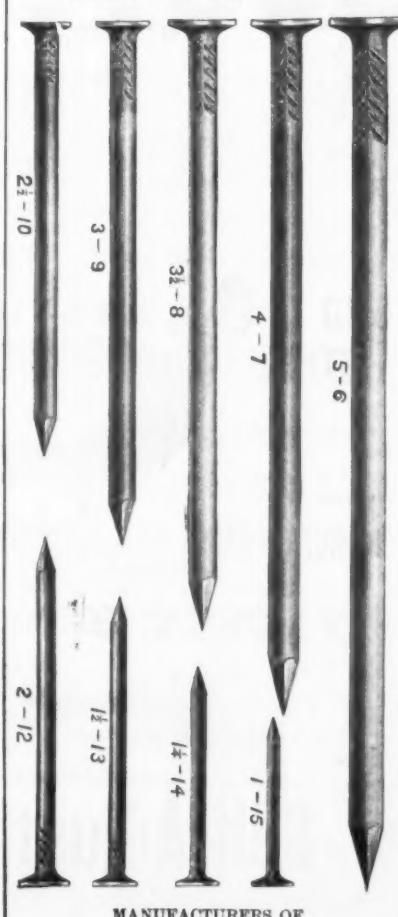
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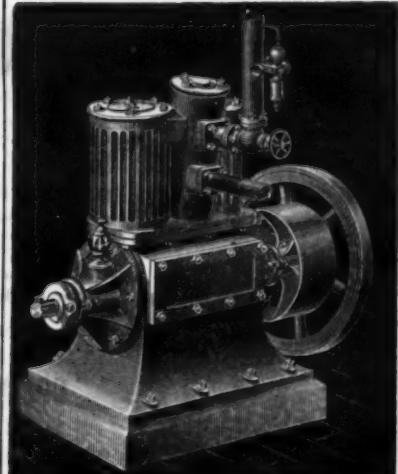
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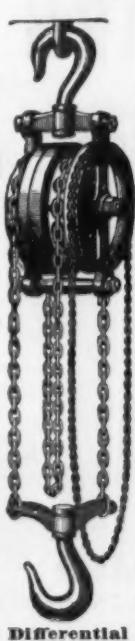
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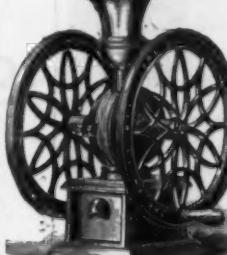
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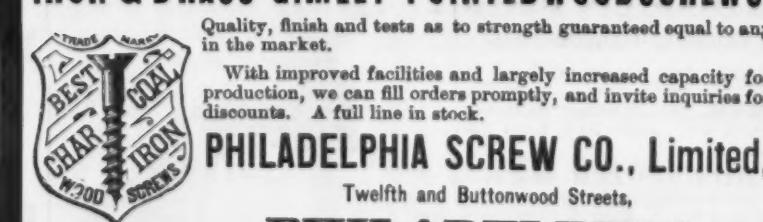
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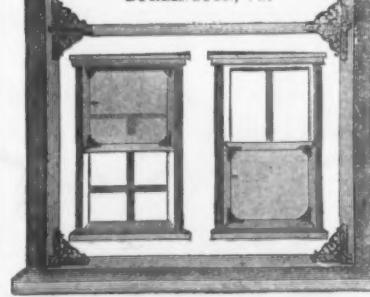
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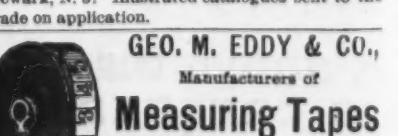
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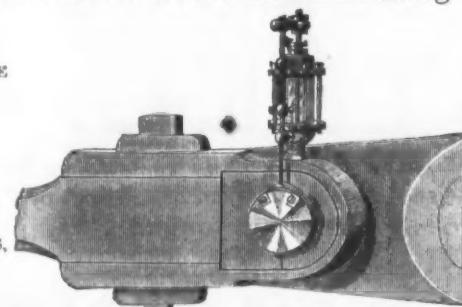
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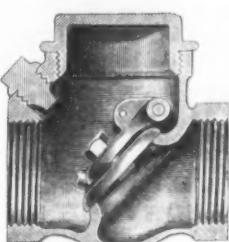
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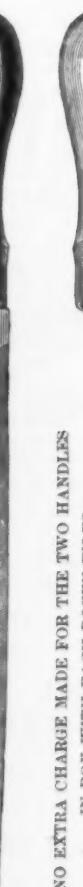
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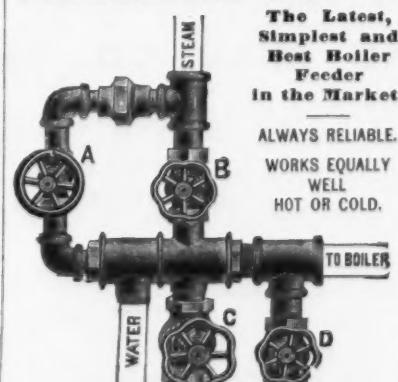
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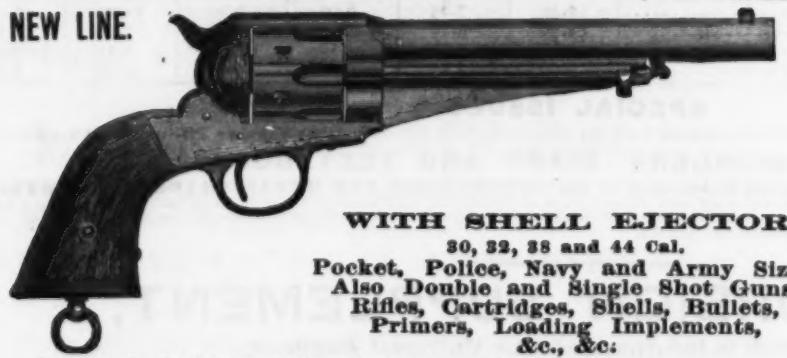
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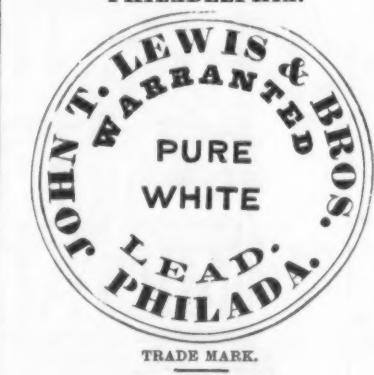
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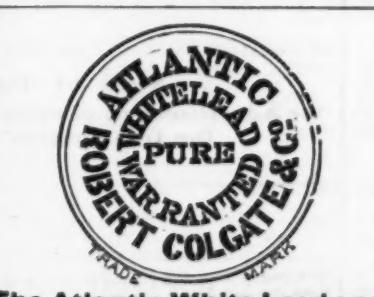


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While it is substantially built,
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Cook's Jennings' new list, Jan. 1, 1884.

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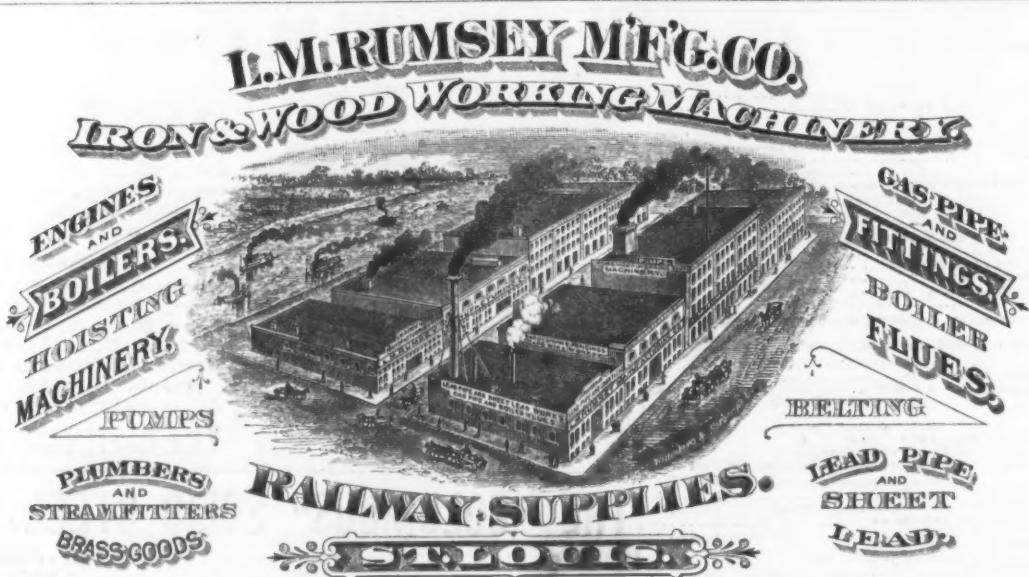
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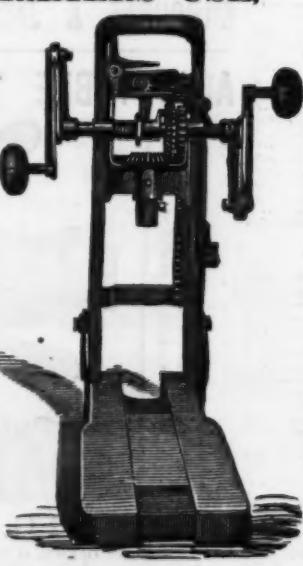


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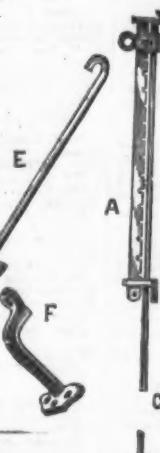
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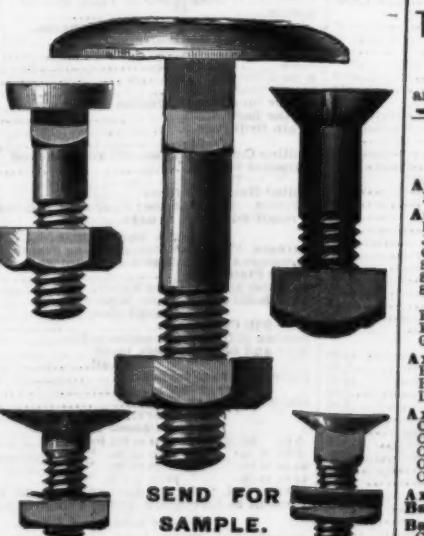
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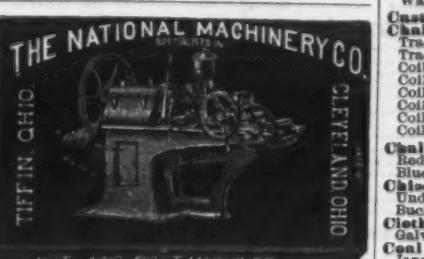
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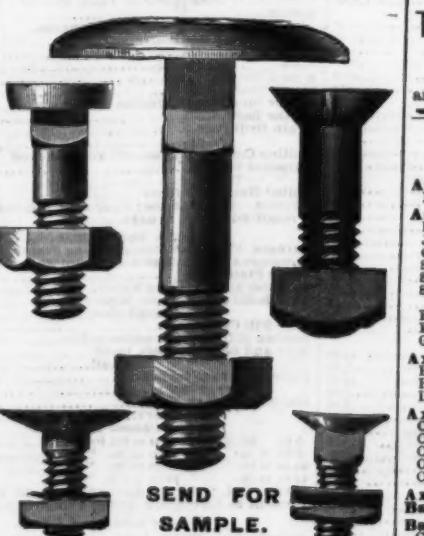
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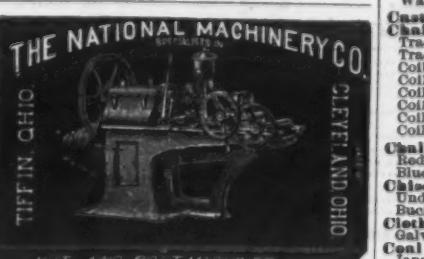
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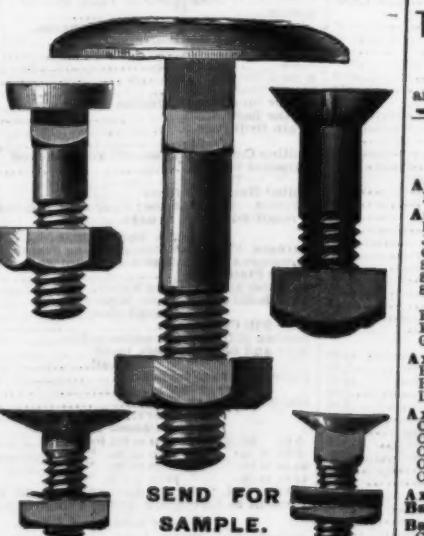
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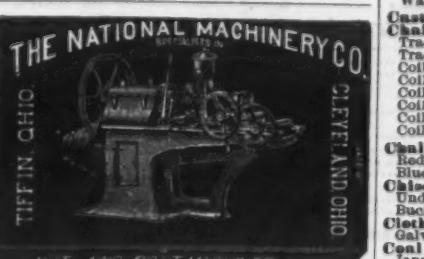
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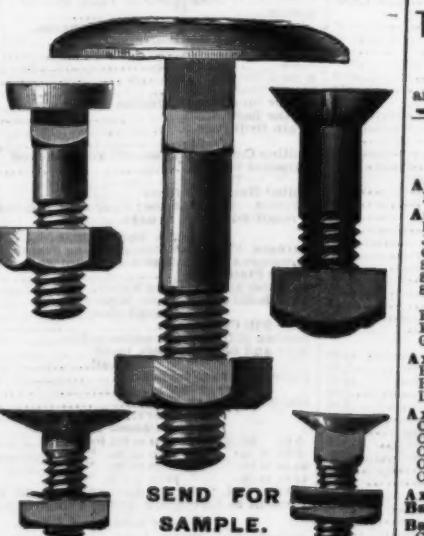
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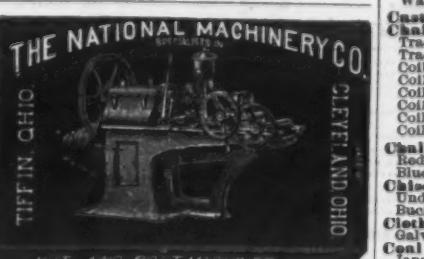
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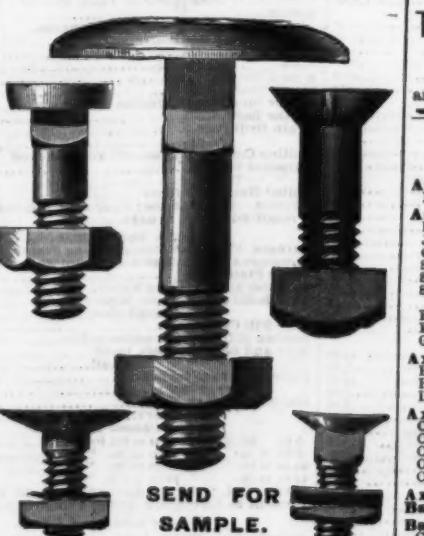
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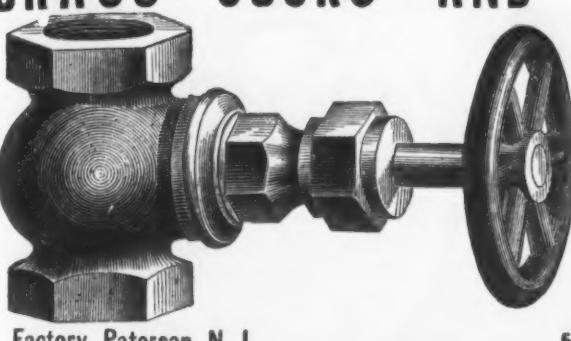
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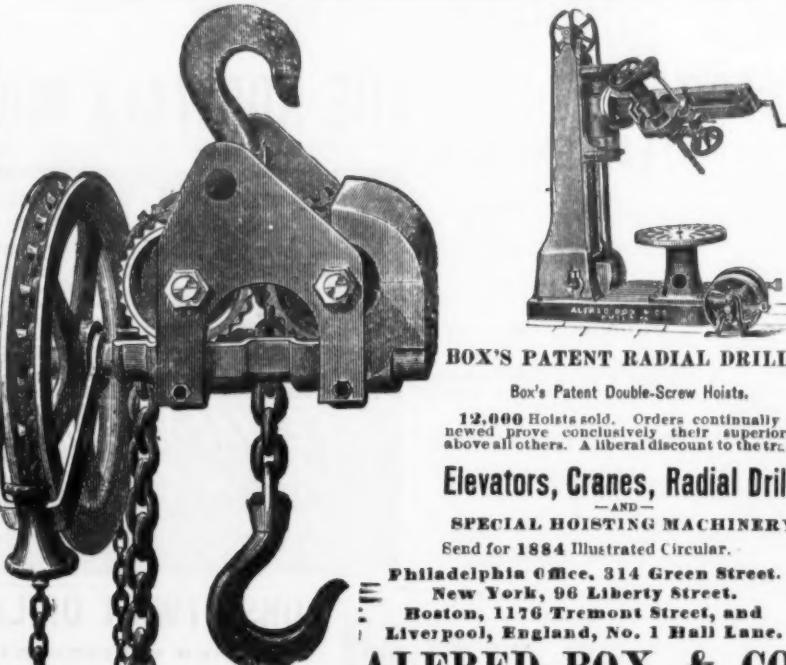
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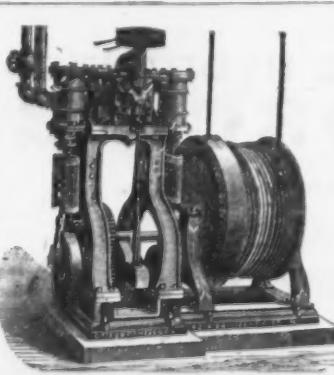


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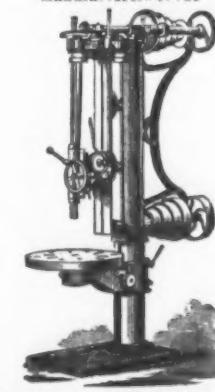


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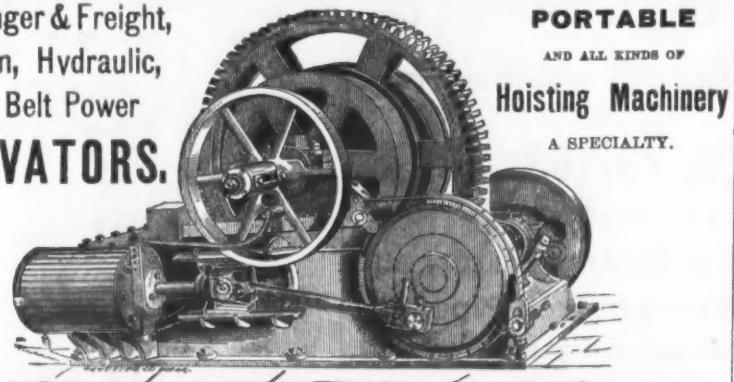
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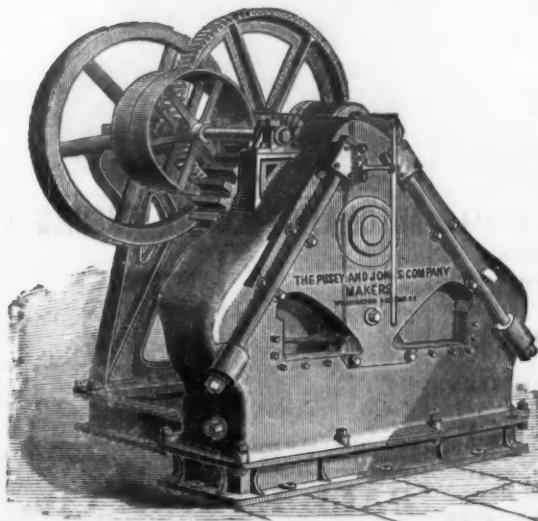
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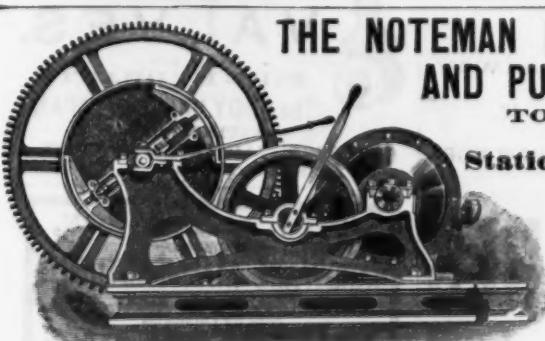
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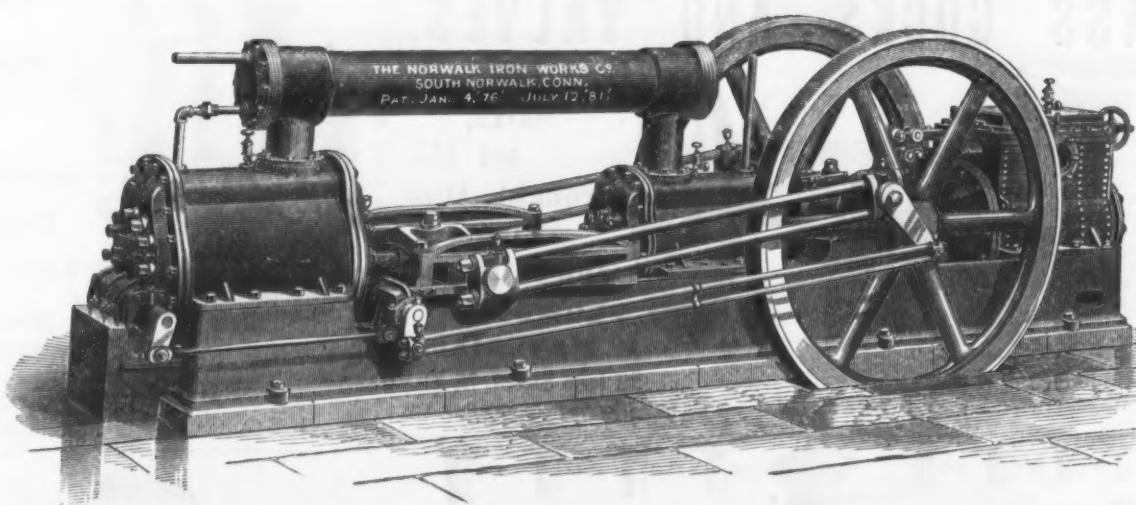
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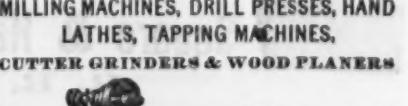
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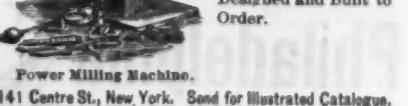


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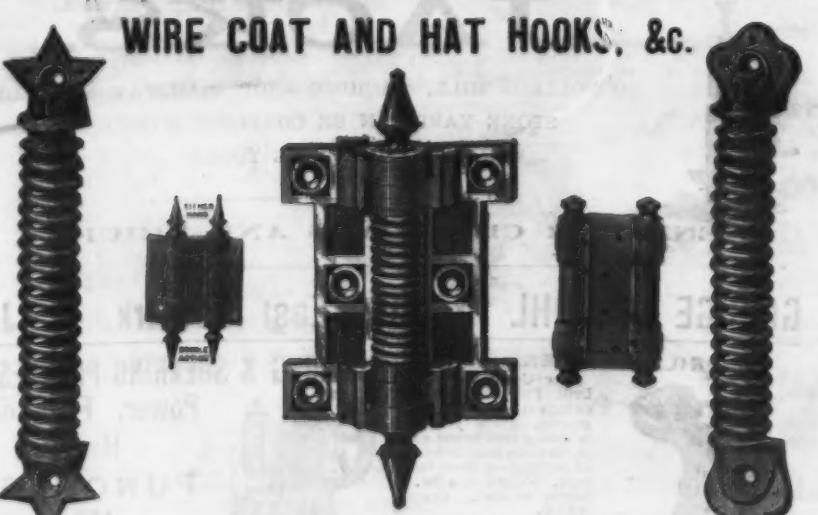
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